

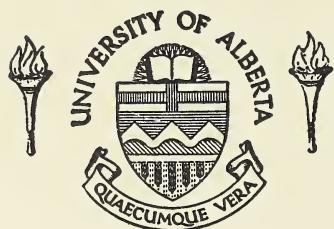
RELATIONSHIP OF
PSYCHOLOGICAL INVENTORY
TO ACHIEVEMENT
C. FAIR

For Reference

NOT TO BE TAKEN FROM THIS ROOM

ESIS
1959
10

Ex LIBRIS
UNIVERSITATIS
ALBERTAENSIS





Digitized by the Internet Archive
in 2018 with funding from
University of Alberta Libraries

<https://archive.org/details/fair1959>

THE UNIVERSITY OF ALBERTA

THE RELATIONSHIP OF
THE CALIFORNIA PSYCHOLOGICAL INVENTORY
TO ACADEMIC ACHIEVEMENT

A DISSERTATION
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS

DEPARTMENT OF PHILOSOPHY AND PSYCHOLOGY

by

DONALD CLARENCE FAIR

EDMONTON, ALBERTA

MARCH, 1959

ABSTRACT

The hypothesis that one or more of the scales of the California Psychological Inventory, by Harrison G. Gough, will identify students who are likely to achieve at a level below their academic capacity was investigated.

The inventory was administered to a sample of 47 male freshman students placed on probation by the University in January, 1958, and to a matched sample of 47 male freshman students not placed on probation. The students were matched in respect of the following variables: age, academic ability, faculty and pattern, residence in Canada for at least the past five consecutive years, and English as the major language spoken in the home.

For the purpose of establishing norms for use at the University of Alberta, the inventory was administered to an additional sample of 273 male freshman students randomly selected from all academic programs.

No significant differences were found between means on the eighteen CPI scales for the probation and non-probation samples. However, analysis of first year averages of the students in both samples indicated that "probation" was a poor criterion for separating poor achievers from good achievers. This finding gave rise to a further enquiry in which scale means for the normative students who obtained high first year averages were compared with those for normative students who failed their

year. Significant differences were found for only two of the eighteen scales of the CPI. However, the good achievers tended to obtain lower mean scores on the scales of poise, ascendancy, and self-assurance, and higher mean scores on the scales of socialization, maturity, responsibility, and achievement motivation.

A low negative relationship, significant at the 1% level, was found between the Flexibility scale (Fx) and first year averages of 260 students of the normative sample. Low positive relationships, significant at the 5% level, were found between first year average and each of the following scales: Responsibility (Re), Socialization (So), Achievement via Conformance (Ac), and Femininity (Fe). Further research on these scales would appear to be indicated.

A very low, non-significant relationship was found between the Achievement-via-Independence scale (Ai) and the first year averages of the 260 students of the normative sample. This finding is in sharp contrast to that reported by the author of the inventory.

ACKNOWLEDGEMENTS

Grateful acknowledgements are made to all who have helped the writer to bring this project to completion. Members of the staff of the Department of Student Advisory Services , in particular, showed keen interest in the project, and contributed many helpful suggestions. Sincere appreciation is also expressed to the more than three hundred students who very willingly acted as subjects, and thus made the execution of the project possible.

TABLE OF CONTENTS

ABSTRACT	iii
ACKNOWLEDGEMENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	x
I INTRODUCTION	
General Introduction	1
Purpose of Study and Statement of Hypothesis	4
II SURVEY OF THE LITERATURE	6
III METHOD	
A. Measuring Instrument	17
B. Subjects	17
C. Administration of the Inventory	20
D. Treatment of Data	22
IV RESULTS	30
V DISCUSSION OF RESULTS	61
VI CONCLUSIONS	65
VII SUGGESTIONS FOR FURTHER RESEARCH	66
BIBLIOGRAPHY	67
APPENDICES	
"A" Copy of Letter to Students Inviting Participation in the Study	70
"B" (a) Profile for a Freshman Male Student Showing Evidence of "Faking Bad"	71
(b) Profile for a Freshman Male Student Showing Evidence of "Random Answering"	72

"C" Copy of the Mailing Card Used to Invite Students in the Probation and Non-Probation Samples to Participate in the Study	73
"D" Means for the Normative Sample of 273 University of Alberta Freshman Male Students and Means for a Sample of 680 American Male College Students Plotted on Gough's Profile Sheet	74

LIST OF TABLES

TABLE 1	FACULTY DISTRIBUTION OF FRESHMAN MALE STUDENTS PLACED ON PROBATION IN JANUARY, 1958	19
TABLE 2	FACULTY DISTRIBUTION OF THE FORTY-SEVEN MATCHED PROBATION STUDENTS	19
TABLE 3	FACULTY DISTRIBUTION OF STUDENTS IN THE NORMATIVE SAMPLE	21
TABLE 4	FIRST YEAR AVERAGE AND CLASSIFICATION OF STUDENTS IN THE PROBATION AND NON-PROBATION MATCHED SAMPLES, April 1958 ...	23
TABLE 5	FIRST YEAR AVERAGE AND CLASSIFICATION OF NINETEEN MATCHED PAIRS OF PROBATION AND NON-PROBATION STUDENTS	27
TABLE 6	FIRST YEAR AVERAGE AND CLASSIFICATION OF TWELVE MATCHED PAIRS OF PROBATION AND NON-PROBATION STUDENTS	28
TABLE 7	FACULTY DISTRIBUTION OF NORMATIVE STUDENTS WHOSE FIRST YEAR AVERAGES WERE BELOW 50%, OR 70% OR BETTER	29
TABLE 8	MEANS AND STANDARD DEVIATIONS FOR THE PROBATION SAMPLE AND THE NON-PROBATION SAMPLE ON EACH OF THE SCALES OF THE CPI, WITH INDICATIONS OF THE SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS	31
TABLE 9	MEANS, STANDARD DEVIATIONS AND STANDARD SCORE POINTS 40 AND 60 FOR EACH OF THE CPI SCALES FOR THE NORMATIVE SAMPLE (N=273)	34
TABLE 10	CORRELATION OF SCALE MEANS WITH FIRST YEAR AVERAGE OF STUDENTS IN THE NORMATIVE SAMPLE (N=260)	53
TABLE 11	MEANS FOR PROBATION AND NON-PROBATION SAMPLES OF NINETEEN STUDENTS EACH, WITH INDICATIONS OF SIGNIFICANCE OF DIFFERENCE	55

TABLE 12	MEANS FOR PROBATION AND NON-PROBATION SAMPLES OF TWELVE STUDENTS EACH, WITH INDICATIONS OF SIGNIFICANCE OF DIFFERENCE ...	57
TABLE 13	MEANS, STANDARD DEVIATIONS, AND SIG- NIFICANCE OF DIFFERENCE BETWEEN MEANS OF NORMATIVE SAMPLE STUDENTS WHOSE FIRST YEAR AVERAGES WERE 70% OR BETTER (N=49), AND THOSE WHOSE AVERAGES WERE BELOW 50% (N=41)	59

LIST OF FIGURES

Figure 1.	Means for the Probation and Non- Probation Matched Samples Plotted on Gough's Profile Sheet	32
Figure 2.	Standard Score Points 40, 50, and 60 Obtained from the Normative Sample in Comparison with Gough's Norms	33
Figure 3a.	Frequency Polygon and Curve of Best Fit for the Dominance Scale (Do) Obtained from the Normative Sample	35
Figure 3b.	Frequency Polygon and Curve of Best Fit for the Capacity for Status Scale (Cs) Obtained from the Normative Sample	36
Figure 3c.	Frequency Polygon and Curve of Best Fit for the Sociability Scale (So) Obtained from the Normative Sample	37
Figure 3d.	Frequency Polygon and Curve of Best Fit for the Social Presence Scale (Sp) Obtained from the Normative Sample..	38
Figure 3e.	Frequency Polygon and Curve of Best Fit for the Self-acceptance Scale (Sa) Obtained from the Normative Sample	39
Figure 3f.	Frequency Polygon and Curve of Best Fit for the Sense of Well-being Scale (Wb) Obtained from the Normative Sample	40
Figure 3g.	Frequency Polygon and Curve of Best Fit for the Responsibility Scale (Re) Obtained from the Normative Sample	41
Figure 3h.	Frequency Polygon and Curve of Best Fit for the Socialization Scale (So) Obtained from the Normative Sample	42
Figure 3i.	Frequency Polygon and Curve of Best Fit for the Self-control Scale (Sc) Obtained from the Normative Sample	43

Figure 3j.	Frequency Polygon and Curve of Best Fit for the Tolerance Scale (To) Obtained from the Normative Sample	44
Figure 3k.	Frequency Polygon and Curve of Best Fit for the Good Impression Scale (Gi) Obtained from the Normative Sample	45
Figure 3l.	Frequency Polygon and Curve of Best Fit for the Communality Scale (Cm) Obtained from the Normative Sample	46
Figure 3m.	Frequency Polygon and Curve of Best Fit for the Achievement via Conformance Scale (Ac) Obtained from the Normative Sample	47
Figure 3n.	Frequency Polygon and Curve of Best Fit for the Achievement via Independence Scale (Ai) Obtained from the Normative Sample	48
Figure 3o.	Frequency Polygon and Curve of Best Fit for the Intellectual Efficiency Scale (Ie) Obtained from the Normative Sample	49
Figure 3p.	Frequency Polygon and Curve of Best Fit for the Psychological-mindedness Scale (Py) Obtained from the Normative Sample	50
Figure 3q.	Frequency Polygon and Curve of Best Fit for the Flexibility Scale (Fx) Obtained from the Normative Sample	51
Figure 3r.	Frequency Polygon and Curve of Best Fit for the Femininity Scale (Fe) Obtained from the Normative Sample	52
Figure 4.	Means for Nineteen Matched Pairs of Probation and Non-Probation Students Plotted on Gough's Profile Sheet	56
Figure 5.	Means for Twelve Matched Pairs of Probation and Non-Probation Students Plotted on Gough's Profile Sheet	58
Figure 6.	Means for Normative Students with First Year Averages of 70% or Better, and Means for those with Averages Below 50%, Plotted on Gough's Profile Sheet	60

I

INTRODUCTION

The university counsellor frequently interviews students whose level of academic achievement is very much below the potential indicated by objective measures of academic ability. The factors which result in this discrepancy are often neither simple to identify, nor easy to measure. Nevertheless, the counsellor is called upon to assist such students toward a higher level of achievement, a level more consonant with academic capability.

It is generally recognized that personality factors have a decided bearing upon academic achievement. A number of studies (some of which are referred to in the Survey of the Literature) have been carried out in an attempt to obtain objective measures of such personality factors, but with only limited success. Many of these studies have involved the use of "paper-and-pencil" personality inventories, such as, for example, the Minnesota Multiphasic Personality Inventory. (11) A more recent inventory, the California Psychological Inventory, by Harrison G. Gough (7), published in 1957, appeared to hold some promise in relation to counselling generally, and, in particular, to the problem of underachievement.

The California Psychological Inventory¹ is an empirically validated personality inventory containing

¹Hereinafter referred to as the CPI.

eighteen scales, each designed to measure a specific trait of personality. The scales are grouped into four categories as follows:

Class I Measures of Poise, Ascendancy, and Self-Assurance

1. Do Dominance
2. Cs Capacity for Status
3. Sy Sociability
4. Sp Social Presence
5. Sa Self-acceptance
6. Wb Sense of Well-being

Class II Measures of Socialization, Maturity, and Responsibility

7. Re Responsibility
8. So Socialization
9. Sc Self-control
10. To Tolerance
11. Gi Good impression
12. Cm Communality

Class III Measures of Achievement Potential and Intellectual Efficiency

13. Ac Achievement via conformance
14. Ai Achievement via independence
15. Ie Intellectual efficiency

Class IV Measures of Intellectual and Interest Modes

16. Py Psychological-mindedness
17. Fx Flexibility
18. Fe Femininity (8 , p. 7)

Gough developed the CPI with two goals of personality assessment in mind. He describes these goals as follows:

... The first goal, largely theoretical in nature, has been to use and to develop descriptive concepts which possess broad personal and social relevance. Many of the standard personality tests and assessment devices available previously have been designed for use in special settings, such as the psychiatric clinic, or have been constructed to deal with a particular problem, such as vocational choice. The

present endeavor has been concerned with characteristics of personality which have a wide and pervasive applicability to human behavior, and which in addition are related to the favorable and positive aspects of personality rather than to the morbid and pathological.

The second goal for the CPI has been the practical one of devising brief, accurate, and dependable subscales for the identification and measurement of the variables chosen for inclusion in the inventory. A further consideration has been that the instrument be convenient and easy to use and suitable for large-scale application. (8, p. 7)

Regarding the intended use of the inventory Gough states that:

The inventory is intended primarily for use with "normal" (non-psychiatrically disturbed) subjects. Its scales are addressed principally to personality characteristics important for social living and social interaction. Thus, while it has been found to have special utility with a few problem groups, e.g. persons of delinquent, asocial tendencies, it may be expected to find most general use in schools, colleges, business and industry, and in clinics and counselling agencies whose clientele consists mainly of socially-functioning individuals. (8, p. 7)

The CPI contains a total of 480 items or statements which are answered either "true" or "false". Of these approximately 200 are taken from the Minnesota Multiphasic Personality Inventory. (11) Twelve items are duplicated for ease of machine scoring. The number of items in the individual scales ranges from 22 for each of the Py and Fx scales to 56 for the Sp scale. The items for the eighteen scales are thoroughly mixed in random fashion.

An empirical approach was used in the development of the CPI scales. A criterion dimension, e.g. sociability, was first defined and then items which seemed to be psychologically related to the criterion were collected

in a preliminary measuring scale. The scale was then administered to an experimental group of persons who had previously been rated independently on the trait or dimension being considered. An item analysis was then carried out and the items which appeared to discriminate in respect to the particular criterion were retained for the scale.

The validity and reliability of the CPI have been the subjects of a number of investigations. Validity of the scales was generally established by correlation with independent criteria. In studies summarized by Gough in the Manual (8, p. 23-27) the correlations ranged from 0.21 between Sc (self-control) and independent ratings of "impulsivity", to 0.60 between Gi (good impression) and the K (correction) scale of the MMPI. Reliability correlation coefficients ranged from 0.49 for Fx (flexibility) to 0.87 for To (tolerance), with 15 of the 18 scales having coefficients of 0.70 or higher, when a group of 200 prison males were tested a second time after a lapse of from 7 to 21 days. This and other reliability studies are reported by Gough in the Manual. (8)

Purpose of Study and Statement of Hypothesis

Since the CPI appeared to hold some promise in the early identification of those students unlikely, without counselling assistance, to achieve at or near their academic potential, it was considered that this

possibility should be investigated, and that this might best be achieved by comparing the means obtained on the CPI by a sample of students making satisfactory academic progress with the means obtained by a matched sample of inadequate achievers. A secondary purpose of the study was to establish norms on the CPI for use at the University of Alberta.

In more precise terms, the hypothesis to be tested is as follows:

One or more of the scales of the California Psychological Inventory will identify students likely to achieve at a level below their intellectual potential.

II

SURVEY OF THE LITERATURE

Considerable research has been carried out in attempts to determine the relationship between various personality factors and academic achievement. In this survey, research involving the use of published "adjustment" or "personality" inventories was sampled. These include, among others, studies involving the use of the Adjustment Inventory, the Minnesota Multiphasic Personality Inventory, the Guilford-Zimmerman Temperament Survey, and the Bernreuter Personality Inventory. The survey concludes with a summary of some of the research carried out by Gough, the author of the CPI, in his attempt to develop personality scales of value in predicting academic achievement. Very little other research on the CPI has been reported in the literature to date, a fact undoubtedly accounted for by the newness of the CPI.

Drought (6) administered the Adjustment Inventory, by Hugh Bell, and the Wisconsin Scale of Personality Traits, by Ross Stagner, to 750 freshman students entering the College of Letters and Science of the University of Wisconsin in September, 1935. He correlated the scores for each of the four sub-tests of these two measures with the discrepancy between predicted and achieved grades. The resulting correlations were found to be uniformly low. He concluded that "the tests used in this study

are of little value for the purpose of differentiating between students who will obtain grades above prediction and those who will fall markedly below prediction." (6 , p. 604) He further concluded that "the present data show quite clearly that there is no relationship between adjustment as measured and relative performance in college. And yet there is abundant literature to support the thesis that social and emotional adjustment, for example, do play an important part in college achievement." (6 , p. 605)

Darley (5) reported a similar study carried out at the General College, University of Minnesota during the 1935-36 academic year. Three attitude and adjustment scales - the Minnesota Scale for the Survey of Opinions, the Adjustment Inventory, and the Minnesota Inventories of Social Attitudes - were administered to 326 men and 217 women. Retesting was carried out after an average interval of 9.2 months. The three measures yielded twelve attitude or adjustment scores. The relationship between each of these scores and average grades of the students was studied. Statistical significance was obtained for only two of these relationships. Darley describes these as follows: "Both sexes show a clear relation between economically radical viewpoints and higher grade records. Women show a tendency for lower grades accompanying extreme sociability." (5 , p. 489) He found, further, that "the absence of statistically significant deviate scores in attitudes or adj-

ustment is accompanied by a higher predictive correlation coefficient between ability and achievement than is found in the total group." (5, p. 491) His general conclusion was that "while it is impossible to state from these data that measured maladjustment and radicalism lead to student mortality ... it does appear that measured maladjustment or radicalism may depress achievement below the level to be expected from ability, unless affected by some counter stimulant." (5, p. 493)

The Sheer Self-Concept Test was used, along with other tests, by Chapman (3) in a prediction study at Southern Methodist University. The purpose of his research was to determine the value of a group of standardized test scores and high school grades in predicting first semester grades. From the results of the study he concluded, among other things, that "it is reasonable to assume that personality factors bear some relationship to college success. Though the Sheer Self-Concept Test failed to show consistently significant relationships to grade-point averages, the trends are sufficient to warrant further consideration for research." (3, p. 1201)

The Guilford-Zimmerman Temperament Survey was used by Knaak (13) at Northwestern University in an effort to discover the common and distinguishing characteristics of academically successful and unsuccessful freshman women. The academically successful students were honors

students with minimum grade averages of A -, and the academically unsuccessful were those placed on probation by the University. The group consisted of thirty-five honors students and forty-four probation students.

Knaak found that "women in the probation group received significantly higher scores than did honors students in the area of Sociability. Honors students, on the other hand, scored higher in the areas of Seriousness and Reflectiveness." (13, p. 305) She found these differences to be significant at the 1% level of confidence.

Cash (2) investigated the relationship between personal characteristics and academic achievement in theological studies. His subjects were 134 students registered at the Oberlin Graduate School of Theology for the three academic sessions 1949-50 to 1951-52 inclusive. Among other measures, he used the Bernreuter Personality Inventory, its six scales being used as measures of six personal traits. His findings included a significant relationship between the characteristic of Self-sufficiency (Bernreuter B2-S) and grade-point ratios in courses in the New Testament.

Bresee (1) used both structured and unstructured tests to compare a group of achievers with a group of underachievers of similar intellectual capacity. The achievers group consisted of 44 students whose grade-point averages were B or better; the underachievers group consisted of 33 students whose grade-point averages were D or

poorer. The I.Q. ratings of students in both groups were greater than one standard deviation above the mean. Among the tests used were the Rosenzweig Picture-Frust-ration Test, the Maslow S-I Inventory, the Gordon Personal Profile, and the Study of Values. Some of the findings as outlined by Bresee were as follows: "The underachievers differed significantly from the achievers in expressing more hostility and extrapunitiveness. The differences between the groups which were non-significant, but in the direction hypothesized, were as follows: the underachievers gave more expression to feelings of insecurity, placed their families lower on the occupational scale, saw themselves as less ascendant and less responsible ..." (1, p. 90) He warns, however, that these findings should be interpreted cautiously when dealing with individual cases because of the large amount of overlapping present.

Since nearly half of the items in the CPI were drawn from the Minnesota Multiphasic Personality Inventory, several research studies involving the use of the MMPI are described in the following paragraphs.

On the basis of MMPI profiles, Hoyt and Norman (12) selected three groups of freshman men who entered the Arts College of the University of Minnesota in each of 1951-52 and 1952-53. All freshman students at the University of Minnesota were asked to complete the MMPI at the time of admission. The three groups were described as follows: a

"maladjusted" group consisting of students who had a T-score of 70 or above on two or more of the MMPI scales (excluding Mf), a "one-peak" group consisting of students who had only one T-score above 70 (excluding Mf), and a "normal" group consisting of students who had no T-scores above 60. The group sizes ranged from 43 to 78 students in the single year periods to combined totals of from 99 to 127 students. Two aptitude tests - the Ohio State Psychological Examination and the A.C.E. Psychological Examination - were also administered and correlations between first quarter grades and the two aptitude test scores were calculated for each of the groups. The hypothesis tested was that "academic ability tests will predict grades less well for a maladjusted population than for a well-adjusted population." (12, p. 96) The correlation of grades with the Ohio State Psychological Examination yielded results highly consistent with the hypothesis whereas the A.C.E. Examination correlation results did not support the hypothesis. Among other things, the authors concluded that: 1) "The Ohio State Psychological Examination predicts grades more accurately for freshman men with 'normal' MMPI profiles than for those with very deviant profiles, thus confirming the major hypothesis of the study. 2) The relationship between 'predictability' and 'adjustment' is less clear when the A.C.E. is the measure of aptitude; the meaning of this finding is obscured

by the fact that the A.C.E. was used for admission purposes." (12, p. 99)

In similar research, Thompson (15) found that "men with deviate MMPI profiles tend not to achieve as well scholastically as men with 'normal' profiles. Therefore, there appears to be value in the use of psychological measuring devices for counselling and 'in care' help for seminarians in training, since some interest and personality traits appear to relate to seminary achievement." (15, p. 1847)

Van Dalsem (16) used the MMPI along with other tests in a study designed to test the hypothesis that "the low achiever differs from the normal-achiever in certain identifiable variables other than academic aptitude or verbal intelligence." (16, p. 1233) She was concerned with achievement in secondary school English, and found that the MMPI failed to yield statistically significant results.

In research at the University of Alberta, Clarke and McGregor (4) administered the MMPI and other tests to a group of ninety-one Alberta teachers enrolled in a course in Mental Hygiene and Guidance. They found that there was no significant relationship between adjustment, as measured by the Si, D, and Sc scales of the MMPI, and grades in the Mental Hygiene and Guidance course.

Schofield (14) studied the similarities and differ-

ences of MMPI profiles for University of Minnesota junior medical students of the upper and lower quarters of academic achievement. The two groups of eleven students each were matched for academic aptitude on the basis of ACE scores. He found that the Hy, Pd, and Sc scales yielded results negatively related to the honor point ratio and that the differences between the two groups on these scales were significant. He commented that "the differences between the two groups are seen to be limited to a very few scales and, while statistically reliable, are not great." (14 , p. 47)

Two of the eighteen CPI scales - Ac (achievement via conformance) and Ai (achievement via independence) - were designed specifically for prediction of academic achievement. The Ac scale was designed primarily as a predictor of achievement at the high school level, and the Ai of achievement at the college and university level. Research carried out by Gough in the development and validation of these two scales is described below.

In developing the Ac scale, Gough (10) first collected an item pool of 200 items related to the dimension being considered. About 100 of these were drawn from previous studies and the others were new items written from "intuitive hunches", a knowledge of theories about academic motivation and achievement, etc. The 200 items were administered to 441 Minnesota senior class students

from four high schools. Item analysis was carried out and items which showed discriminatory power were retained - 64 items in all. The correlation of the 64 item scale with honor point ratios for the 441 students from the four high schools ranged from 0.52 to 0.63. The correlation of the scale with I.Q. ratings ranged from 0.23 to 0.37.

The 64 item scale contained 16 items related directly to present school behavior. With these 16 items eliminated, the validity coefficients for the 441 students ranged from 0.34 to 0.61.

A cross-validation sample of 234 high school seniors from Rock Island, Illinois, were given a shortened 38 item version of the Ac scale. Correlation of Ac with high school grade average was 0.44, and with I.Q. was 0.26. The multiple correlation of Ac and I.Q. with grade average was 0.62.

A correlation of only 0.18 was found between Ac and examination results in an introductory psychology course taken by a class of 180 students at the University of California. In explaining this difference from the correlations obtained with the high school students, Gough states that these results indicate "that a somewhat different constellation of factors enters into success at the college level. Some recent exploratory work of the present writer indicates that self-sufficiency and independent judgment, for example, play a more prominent role in

college academic success than in high school." (10, p. 330)

The same basic approach was used by Gough (9) in the development of the Hr (honor point ratio) scale. (The name of this scale was later changed to "achievement via independence") A pool of 150 items was collected and administered to four sample groups of students - introductory psychology classes at the University of California, the University of Minnesota, and Vanderbilt University. Thirty-six items were retained to comprise the Hr scale after item analysis was carried out. Correlations of the scale with course grades of the 603 students in the original four samples ranged from 0.42 to 0.57, with a median correlation of 0.47. Four cross-validating samples of University of California freshman students, totalling 336 cases, were given the 36 item scale with a resulting median r of 0.33.

The original 36 item scale contained four items related directly to present attendance in schools. These were eliminated and the 32 item version included in the CPI as the Ai scale.

Cross-validation studies involving eleven college samples and 1253 cases were carried out with a resulting mean correlation of 0.38 between the Ai scale and course grades. A slightly lower correlation of 0.36 was obtained between the Ai scale and high school grades for six samples totalling 1108 cases.

The above sampling of research makes it abundantly

clear that, while there is undoubtedly a relationship between academic achievement and personality factors, this relationship is difficult both to define and to measure. This whole problem is obviously open to further research, and a need is indicated for the development and validation of new personality measuring devices. Research involving the use of the CPI may serve to focus further attention on this problem and lead to useful empirical results.

III

METHOD

A. Measuring Instrument.

The measuring instrument used was the California Psychological Inventory, an eighteen scale paper-and-pencil personality inventory. It consists of a twelve page booklet and separate answer sheet of either the hand-scoring or I.B.M. machine-scoring type. Instructions for completing the inventory are printed on the cover of the booklet, and administration is carried out according to instructions provided in the Manual. (8, p. 8) The inventory is untimed, and usually takes from forty-five minutes to an hour to complete.

B. Subjects.

The subjects were freshman male students from all faculties and schools in which males are registered at the University of Alberta. The following samples were selected for study:

- 1) Two matched samples of 47 students each. From among the 125 male students placed on probation¹ following the December, 1957, examinations, a sample of 47 was matched on the following variables with a sample of 47 male students drawn from among those male students who were

¹A freshman student at the University of Alberta is normally placed on probation if he fails more than half of his December examinations. A mark below 50% is considered a failure.

not placed on probation:

- a) Age - a maximum of 12 months difference in age was permitted.
- b) Academic ability - A.C.E.¹ "Total" scores were converted to standard scores and matched to the nearest 0.2 of a standard score.²
- c) Faculty and pattern.
- d) First year in attendance at any university.
- e) Resident in Canada for at least the past five years.
- f) English spoken as the major language in the home.

The distribution of the 125 male probation students by faculty is given in Table 1. The distribution of the 47 matched probation students by faculty is given in Table 2.

2) A normative sample of 273 students. This large sample was used to establish norms on the CPI for use at the

¹American Council on Education Psychological Examination for College Freshmen, 1949 Edition, prepared by Educational Testing Service from materials developed by L.L. Thurstone and T.G. Thurstone. This examination was included in a battery of tests administered to all incoming freshman students in September, 1957, by the Department of Student Advisory Services. Means, standard deviations, and percentiles were calculated for each of the faculties and schools, and used as a basis for interpreting test results to the students in counselling interviews.

²The formula used in calculating the standard scores was $\frac{X - \bar{X}}{S}$. Means and standard deviations for the separate faculties and schools were used in the calculations.

TABLE 1

FACULTY DISTRIBUTION OF FRESHMAN MALE STUDENTS
PLACED ON PROBATION IN JANUARY, 1958

Faculty or School	Number
Arts & Science (B.A. & B.Sc.)	41
Arts & Science (B.A.L.L.B.)	8
Arts & Science (Predentistry)	6
Commerce	11
Pharmacy	8
Agriculture	5
Physical Education	4
Engineering	27
Education: B.Ed.	1
Jr.E.	14
Total	<u>125</u>

TABLE 2

FACULTY DISTRIBUTION OF THE FORTY-SEVEN MATCHED
PROBATION STUDENTS

Faculty or School	Number
Arts & Science (B.A. & B.Sc.)	11
Arts & Science (B.A.L.L.B.)	4
Arts & Science (Predentistry)	1
Commerce	5
Pharmacy	1
Agriculture	1
Physical Education	0
Engineering	18
Education: B.Ed.	0
Jr.E.	6
Total	<u>47</u>

University of Alberta. These students were selected from the total freshman male student population of 823 students by use of a table of random numbers.

Names of 305 students were selected in this manner, and a letter inviting participation in the study was sent to each.¹ (See Appendix "A") Of this number, 275 students responded and later completed the CPI. The CPI profiles for two of the students showed definite evidence of faking² and were eliminated before statistical calculations were carried out. These two profiles (without names) are given in Appendix 'B". The faculty distribution of students in the normative sample is given in Table 3.

C. Administration of the Inventory.

The CPI was administered in supervised groups according to the instructions given in the Manual. (8) The testing session began with a short unstandardized talk given by the writer to supplement the information

¹The writer is indebted to Dr. A.J. Cook, Director of Student Advisory Services, for granting his permission to have the letter sent out under his signature. It was felt that this procedure would encourage better student cooperation.

²The author of the inventory states that three scales - Wb (sense of well-being), Gi (good impression), and Cm (communality) - were designed to aid in the identification of "faked" profiles. An unusually low score on Wb along with corresponding low scores on three or four other scales (usually Ie, Cm, Ac, and To) suggests a "fake bad" profile. An unusually high Gi score along with an overall elevated profile suggests an attempt to create a "good impression". A very low Cm score (below 20) suggests random answering of the inventory. (8 , p. 19)

given in the letter inviting the students to participate in the study. (See Appendix "A") The talk included a statement of appreciation to the students for taking part in the study, assurance that the individual test results would be kept confidential, and an offer to individually discuss the results, if desired.

TABLE 3

FACULTY DISTRIBUTION OF STUDENTS IN THE
NORMATIVE SAMPLE

Faculty or School	Number
Arts & Science (B.A. & B.Sc.)	63
Arts & Science (B.A.L.L.B.)	14
Arts & Science (Predentistry)	7
Commerce	7
Pharmacy	10
Agriculture	10
Physical Education	5
Engineering	124
Education: B.Ed.	12
Jr.E.	21
Total	<u>273</u>

A number of the students in the matched samples (probation and non-probation) were also members of the normative sample, and hence were tested along with the other members of that sample. Other members of the matched samples had completed the CPI during the course of counselling by members of the staff of Student Advisory Services. The remainder of the students were

invited, by mail, to call at the office of the writer for a few minutes at certain specified times. (See Appendix "C" for mailing card used for this purpose.) They were invited in small groups and their cooperation sought in this face-to-face contact. It was felt that this would be a more effective method of obtaining their cooperation than giving them information regarding the study by letter and asking them to respond. This proved to be true as all of the students thus contacted readily cooperated in completing the CPI. The brief interview with them contained much the same information as the talk to the members of the larger groups mentioned above. These students, however, completed the CPI individually and at their own convenience in the offices of Student Advisory Services.

Upon completion of the inventories they were scored and the individual profiles were plotted on the standard profile sheets developed for use with the CPI.

D. Treatment of Data.

1) Matched Samples.

Means and standard deviations were calculated for each of the eighteen scales of the inventory for the probation and non-probation samples, and the Fisher "t" test of significance was applied in order to determine if any obtained differences exceeded chance expectation. The first year average and classification of the students on the basis of final examinations are given in Table 4.

TABLE 4

FIRST YEAR AVERAGE AND CLASSIFICATION OF STUDENTS IN THE PROBATION AND NON-PROBATION MATCHED SAMPLES, April 1958

Student No.	Faculty	Probation		Non-Probation	
		Average	Classification	Average	Classification
1.	Arts & Science	48.2	Cat IV ^a	53.2	Cat II ^b 3S ^c
2.	Arts & Science	51.4	1S 1F ^d	69.0	Clear ^e
3.	Arts & Science	59.4	Clear	54.6	1S
4.	Arts & Science	41.4	Cat IV	55.2	1S
5.	Arts & Science	46.2	Cat IV	65.4	Clear
6.	Arts & Science	56.4	1S	77.2	Clear
7.	Arts & Science	34.8	Cat IV	42.8	Cat IV
8.	Arts & Science	45.0	Cat IV	60.4	Clear
9.	Arts & Science	----	Withdrew	57.2	Clear
10.	Arts & Science	37.6	Cat IV	69.4	Clear
11.	Arts & Science	60.4	Clear	68.6	Clear
12.	B.A.L.L.B.	53.8	Non-prom ^f	66.2	Prom ^g
13.	B.A.L.L.B.	----	Withdrew	51.8	Non-prom 1S1F
14.	B.A.L.L.B.	47.6	Cat II 1S1F	64.2	Prom
15.	B.A.L.L.B.	----	Withdrew	54.8	Def Fin Fr 2 ^h
16.	Freudentistry	48.6	Cat IV	45.6	Cat IV
17.	Commerce	----	Withdrew	54.8	Non-prom 1S
18.	Commerce	----	Withdrew	54.6	Non-prom 2S
19.	Commerce	----	Withdrew	60.6	Prom
20.	Commerce	47.6	Cat IV	71.0	Prom
21.	Commerce	44.2	Cat IV	64.0	Prom
22.	Pharmacy	51.9	Cat IV	64.1	1S
23.	Agriculture	33.3	Cat IV	56.8	Clear
24.	Engineering	43.6	Cat IV	50.4	Cat II 4S
25.	Engineering	45.8	Cat IV	74.4	Def Phy Ed ⁱ
26.	Engineering	44.4	Cat IV	53.5	2S
27.	Engineering	50.1	Cat IV	53.6	1S
28.	Engineering	49.4	Cat IV	51.3	Cat II 3S

TABLE 4 - Continued

Student No.	Faculty	Probation		Non-Probation	
		Average	Classification	Average	Classification
29.	Engineering	56.3	3S	58.4	Clear
30.	Engineering	----	Withdrew	65.3	Clear
31.	Engineering	51.8	Cat II 4S	72.0	Clear
32.	Engineering	42.4	Cat IV	58.0	1S
33.	Engineering	30.9	Cat IV	66.4	Clear
34.	Engineering	42.9	Cat IV	67.6	Clear
35.	Engineering	44.3	Cat IV	44.4	Cat IV
36.	Engineering	----	Withdrew	60.4	Clear
37.	Engineering	----	Withdrew	50.7	1S 1F
38.	Engineering	50.8	Cat II 4S	51.4	Cat II 3S
39.	Engineering	53.6	Cat II 3S	52.9	Cat II 3S
40.	Engineering	46.3	Cat IV	51.5	Cat II 3S
41.	Engineering	----	Withdrew	60.3	1S
42.	Education (JrE)	49.8	Cat IV	65.4	Clear
43.	Education (JrE)	55.4	2S	61.9	Clear
44.	Education (JrE)	----	Withdrew	61.8	Clear
45.	Education (JrE)	57.5	3S	58.8	Clear
46.	Education (JrE)	52.6	Cat II 5S1F	63.4	Clear
47.	Education (JrE)	54.9	Cat II 5S	58.1	2S

^aCategory IV - half or more subjects failed and student required to withdraw from the University.

^bCategory II - fewer than half of subjects failed and supplemental privileges granted, except for subjects failed with very low marks.

^c"S" - supplemental privilege. "3S" - supplemental privilege granted for three subjects failed.

^d"F" - failure, no supplemental privilege. Subject must be repeated for credit.

^eClear - all subjects passed, with 50% being considered the passing mark.

^fNon-prom - not promoted to next year of program.
In the B.A.L.L.B. and Commerce programs a first year
average of 60% is required for promotion to second year.

^gProm - promoted to next year of program.

^hDef Fin Fr 2 - deferred final granted in French 2.

ⁱDef Phy Ed - deficient Physical Education.

2) Normative Sample

Means, standard deviations, and values of $\bar{X} \pm \sigma$ for each of the eighteen scales of the CPI were calculated, and the profiles were plotted. Frequency polygons were drawn for each of the scales and the "best-fitting" normal curves were calculated for each and superimposed upon the corresponding polygons.

The mean normative profile for the 273 Alberta first year students and that for 680 American college students were drawn to provide sight comparison of the two profiles. (See Appendix "D")

Thirteen of the 273 students in the normative sample had either withdrawn before the final examinations or for other reasons did not write all of the finals in April, 1958. For the remaining 260 students in the normative sample, Pearson product-moment coefficients of correlation were calculated in order to determine the relationship between each of the eighteen scales and the first year average.

3) Further Enquiries

Analysis of final examination results of students

in the probation and non-probation samples raised some question as to the validity of "probation" as a criterion of achievement, and prompted the following further enquiries:

a) Comparison of the mean profiles for the Category IV probation students and the corresponding matched non-probation, non-Category IV students. Twenty-two of the forty-seven probation students were Category IV on the basis of their final examination results. (See Table 4) Three of the non-probation students matched with these probation students were also Category IV, and these three matched pairs were eliminated. Results for the remaining 19 matched pairs were then examined. Mean scores, and significance of difference between the means were calculated. The mean profiles were plotted. The first year average and classification of these 19 pairs of students are given in Table 5.

b) Comparison of the mean profiles for the non-probation students whose first year averages were 65% or better and the corresponding matched probation students. The value of 65% was arbitrarily chosen as a cut off point. In this way the better achievers in the non-probation sample and the corresponding matched probation students were separated out for study. Thirteen of the 47 non-probation students cleared their year with a 65% or better average. First year averages for twelve of the matching probation students

TABLE 5

FIRST YEAR AVERAGE AND CLASSIFICATION OF NINETEEN MATCHED PAIRS OF PROBATION AND NON-PROBATION STUDENTS

Student No.	Faculty	Probation		Non-Probation	
		Average	Classifi- cation	Average	Classifi- cation
1.	Arts & Science	48.2	Cat IV	53.2	Cat II 3S
4.	Arts & Science	41.4	Cat IV	55.2	1S
5.	Arts & Science	46.2	Cat IV	65.4	Clear
8.	Arts & Science	45.0	Cat IV	60.4	Clear
10.	Arts & Science	37.6	Cat IV	69.4	Clear
20.	Commerce	47.6	Cat IV	71.0	Prom
21.	Commerce	44.2	Cat IV	64.0	Prom
22.	Pharmacy	51.9	Cat IV	64.1	1S
23.	Agriculture	33.3	Cat IV	56.8	Clear
24.	Engineering	43.6	Cat IV	50.1	Cat II 4S
25.	Engineering	45.8	Cat IV	74.4	Def Phy Ed
26.	Engineering	44.4	Cat IV	53.5	2S
27.	Engineering	50.1	Cat IV	53.6	1S
28.	Engineering	49.4	Cat IV	51.1	Cat II 3S
32.	Engineering	42.4	Cat IV	58.0	1S
33.	Engineering	30.9	Cat IV	66.4	Clear
34.	Engineering	42.9	Cat IV	67.6	Clear
40.	Engineering	46.3	Cat IV	51.5	Cat II 3S
42.	Education (JrE)	49.8	Cat IV	65.4	Clear

^aThese matched pairs were selected from Table 4 and include the probation Category IV students and matching non-probation, non-Category IV students. Refer to Table 4, footnotes, for explanation of the abbreviations used.

were available, the other student having withdrawn before writing the final examinations. The mean scale scores and significance of difference between means were calculated, and the mean profiles plotted on the profile sheet. The first year average and classification of these 12 pairs of matched students are given in Table 6.

TABLE 6

FIRST YEAR AVERAGE AND CLASSIFICATION OF TWELVE MATCHED PAIRS OF PROBATION AND NON-PROBATION STUDENTS

Student No.	Faculty	Probation		Non-Probation	
		Average	Classification	Average	Classification
2.	Arts & Science	51.4	1S 1F	69.0	Clear
5.	Arts & Science	46.2	Cat IV	65.4	Clear
6.	Arts & Science	56.4	1S	77.2	Clear
10.	Arts & Science	37.6	Cat IV	69.4	Clear
11.	Arts & Science	60.4	Clear	68.6	Clear
12.	B.A. L.L.B.	53.8	Non-prom	66.2	Prom
20.	Commerce	47.6	Cat IV	71.0	Prom
25.	Engineering	45.8	Cat IV	74.4	Def Phy Ed
31.	Engineering	51.8	Cat II 4S	72.0	Clear
33.	Engineering	30.9	Cat IV	66.4	Clear
34.	Engineering	42.9	Cat IV	67.6	Clear
42.	Education (JRE)	49.8	Cat IV	65.4	Clear

^aThese matched pairs were selected from Table 4 and include the non-probation students who obtained first year averages of 65% or better and the corresponding matched probation students.

c) Comparison of the mean profile for normative students whose first year averages were 70% or better with that for normative students whose averages were below 50%. Forty-nine of the 273 normative students obtained averages of 70% or better, and forty-one obtained averages below 50%. Scale means, standard deviations, and significance of difference between the means were calculated for these two groups, and the mean profiles were plotted. The distribution of these students by faculty is given in Table 7.

TABLE 7

FACULTY DISTRIBUTION OF NORMATIVE STUDENTS WHOSE FIRST YEAR AVERAGES WERE BELOW 50%, OR 70% OR BETTER

Faculty or School	Below 50%	70% or Better
Arts & Science (B.A. & B.Sc.) .	18	10
Arts & Science (B.A.L.L.B.) ...	1	2
Arts & Science (Predentistry) .	1	1
Commerce	1	0
Pharmacy	0	3
Agriculture	2	2
Physical Education	1	0
Engineering	15	27
Education: B.Ed.	2	2
Jr.E.	0	2
Total	41	49

RESULTS

1. Matched samples of Probation and Non-Probation Students.

No significant differences were found between means for the probation and non-probation samples on any of the eighteen scales of the CPI. (See Table 8) Figure 1 gives supporting visible evidence of this lack of difference between the means.

2. Normative Sample.

a) The means and profile for the normative sample (See Figure 2) closely approximate those of both the probation and non-probation samples. The means, standard deviations, and standard score points 60 and 40 are given in Table 9, and plotted on Gough's profile sheet. (Figure 2)

b) Frequency polygons for each of the scale scores closely approximate normal, except for the Wb, To, and Cm scales, in which some negative skewness is evident. (See Figures 3a, 3r)

c) Significant but low coefficients of correlation were found between the Re, So, Ac, Fx, and Fe scales and first year averages. (See Table 10)

d) Coefficients of correlation between the remaining scales and first year averages were found to be both low and non-significant. (See Table 10)

TABLE 8

MEANS AND STANDARD DEVIATIONS FOR THE PROBATION SAMPLE AND THE NON-PROBATION SAMPLE ON EACH OF THE SCALES OF THE CPI,
WITH INDICATIONS OF THE SIGNIFICANCE OF DIFFERENCE
BETWEEN MEANS

Scale	Probation Sample		Non-Probation Sample		t Test of Significance Between Means
	Mean	S.D.	Mean	S.D.	
Do	26.36	5.59	26.30	6.58	0.016
Cs	18.40	3.84	18.83	4.42	0.358
Sy	24.45	4.66	23.77	4.60	0.622
Sp	35.94	6.94	35.77	5.77	0.132
Sa	21.23	4.39	20.98	4.38	0.289
Wb	36.64	4.91	36.30	3.64	0.350
Re	29.34	5.06	29.45	3.77	0.143
So	36.34	6.30	37.15	5.81	0.654
Sc	27.04	7.07	26.66	7.60	0.254
To	21.66	5.17	22.40	5.02	0.691
Gi	17.62	6.11	16.26	5.44	1.084
Cm	25.60	1.85	26.00	2.01	1.086
Ac	24.87	4.49	25.74	3.86	1.119
Ai	18.47	4.25	19.55	3.88	1.538
Ie	38.17	5.20	38.62	4.62	0.545
Py	9.87	3.25	9.77	2.50	0.207
Fx	9.87	4.06	9.96	4.15	0.102
Fe	14.96	3.96	15.79	3.97	0.983

Note: The following "t" values are required for significance:
 5% level - 1.960
 1% level - 2.576

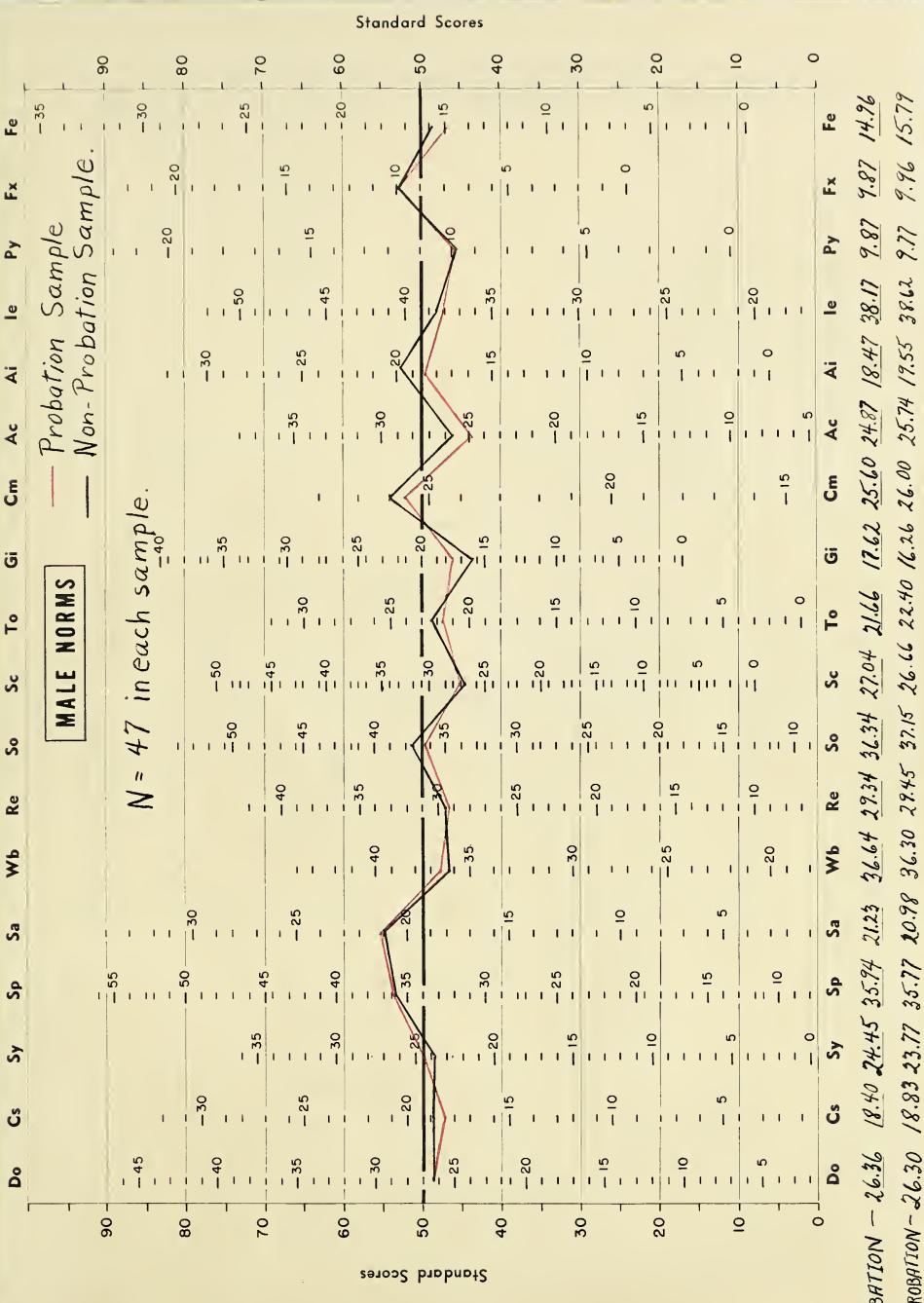


Figure 1. Means for the Probation and Non-Probation Matched Samples Plotted on Gough's Profile Sheet.

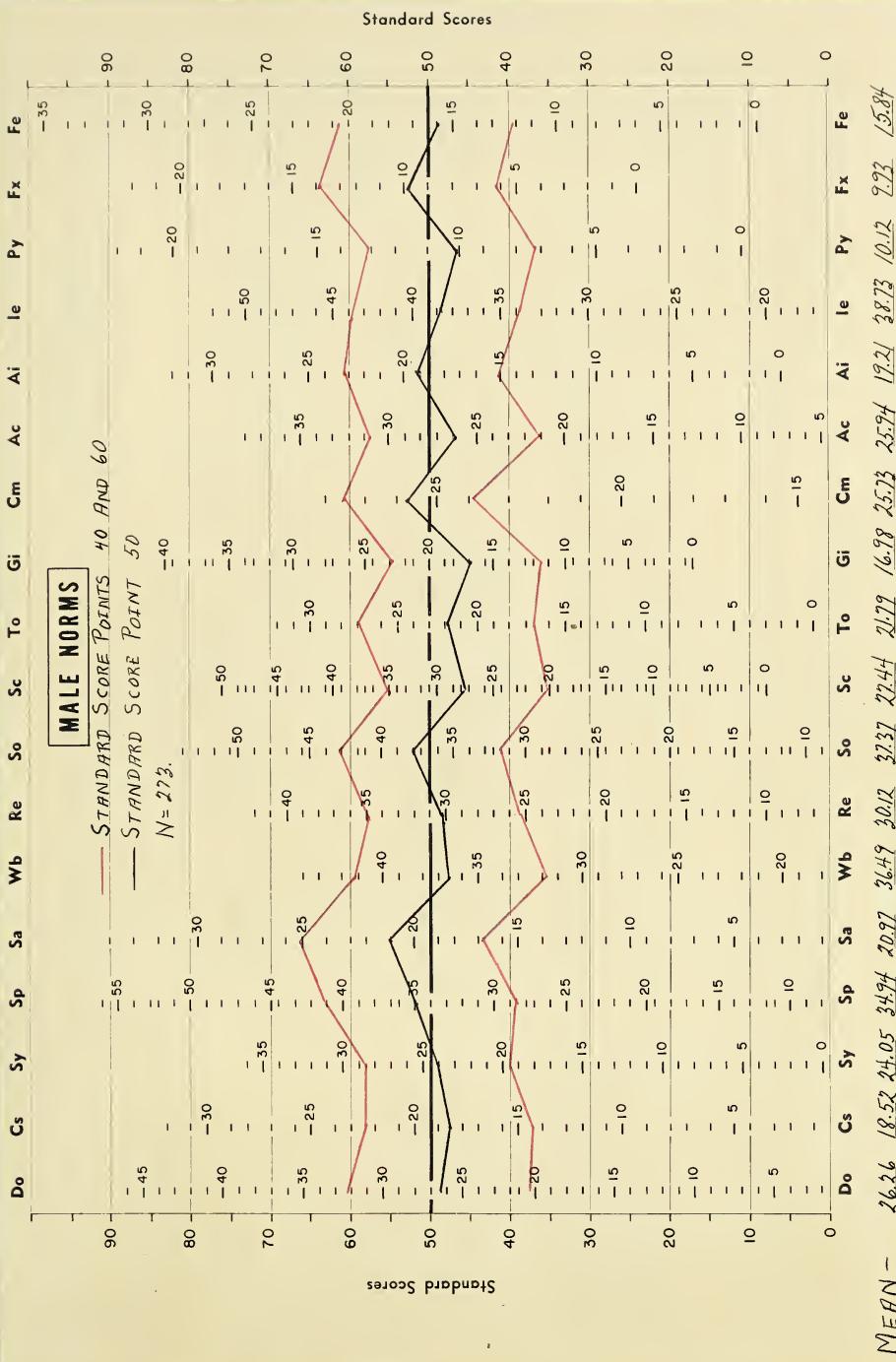


Figure 2. Standard Score Points 40, 50, and 60 Obtained from the Normative Sample in Comparison With Gough's Norms.

TABLE 9

MEANS, STANDARD DEVIATIONS AND STANDARD SCORE POINTS 40
AND 60 FOR EACH OF THE CPI SCALES FOR THE NORMATIVE
SAMPLE N = 273

Scale	Mean	Standard Deviation	Standard Score Point 60	Standard Score Point 40
Do	26.26	6.08	32.34	20.18
Cs	18.52	4.08	22.60	14.44
Sy	24.05	4.68	28.73	19.37
Sp	34.94	6.20	41.14	28.74
Sa	20.97	4.13	25.10	16.84
Wb	36.49	4.75	41.24	31.74
Re	30.12	4.77	34.89	25.35
So	37.37	5.76	43.13	31.61
Sc	27.44	7.42	34.86	20.02
To	21.79	5.24	27.03	16.55
Gi	16.98	5.69	22.67	11.29
Cm	25.73	1.81	27.54	23.92
Ac	25.94	4.74	30.68	21.20
Ai	19.21	4.11	23.32	15.10
Ie	38.73	4.88	43.61	33.85
Py	10.12	2.97	13.09	7.15
Fx	9.93	3.74	13.67	6.19
Fe	15.84	3.75	19.59	12.09

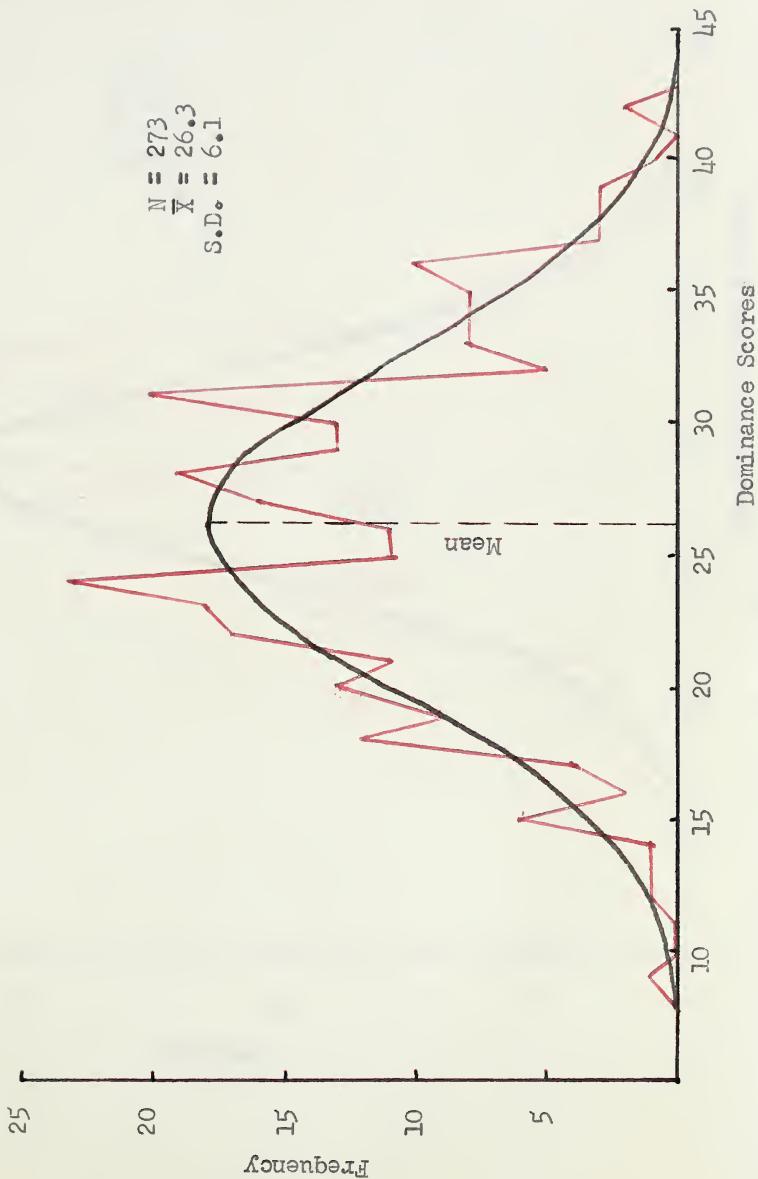


Figure 3a. Frequency Polygon and Curve of Best Fit for the Dominance Scale (Do) Obtained from the Normative Sample.

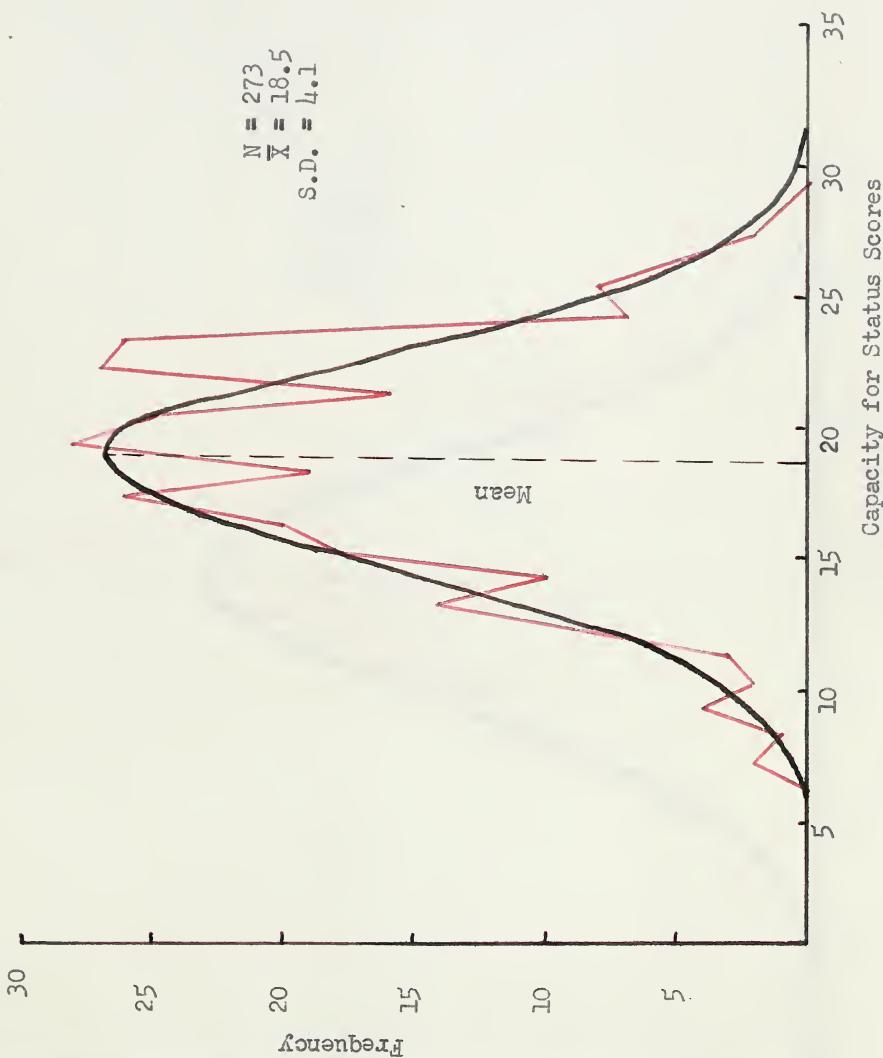


Figure 3b. Frequency Polygon and Curve of Best Fit for the Capacity for Status Scale (Cs) Obtained from the Normative Sample.

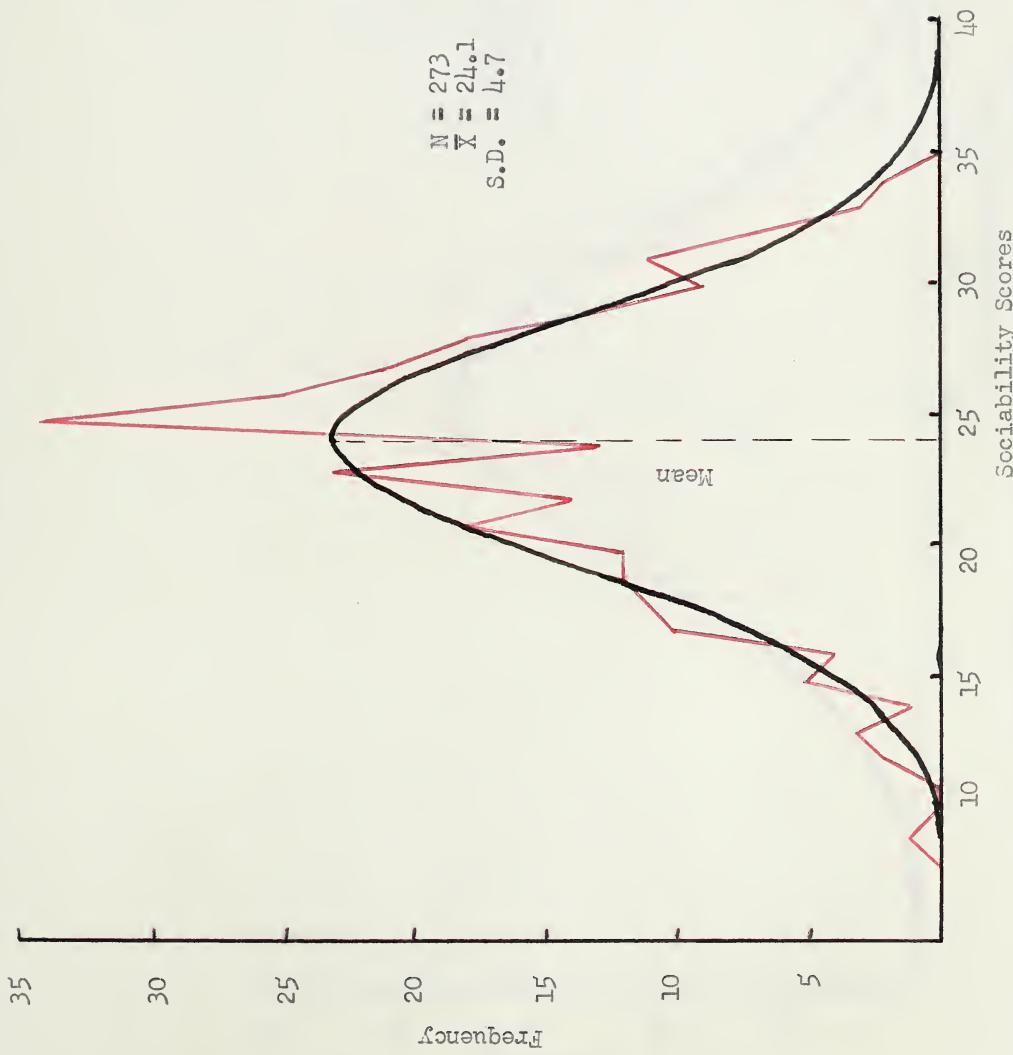


Figure 3c. Frequency Polygon and Curve of Best Fit for the Sociability Scale (So) Obtained from the Normative Sample.

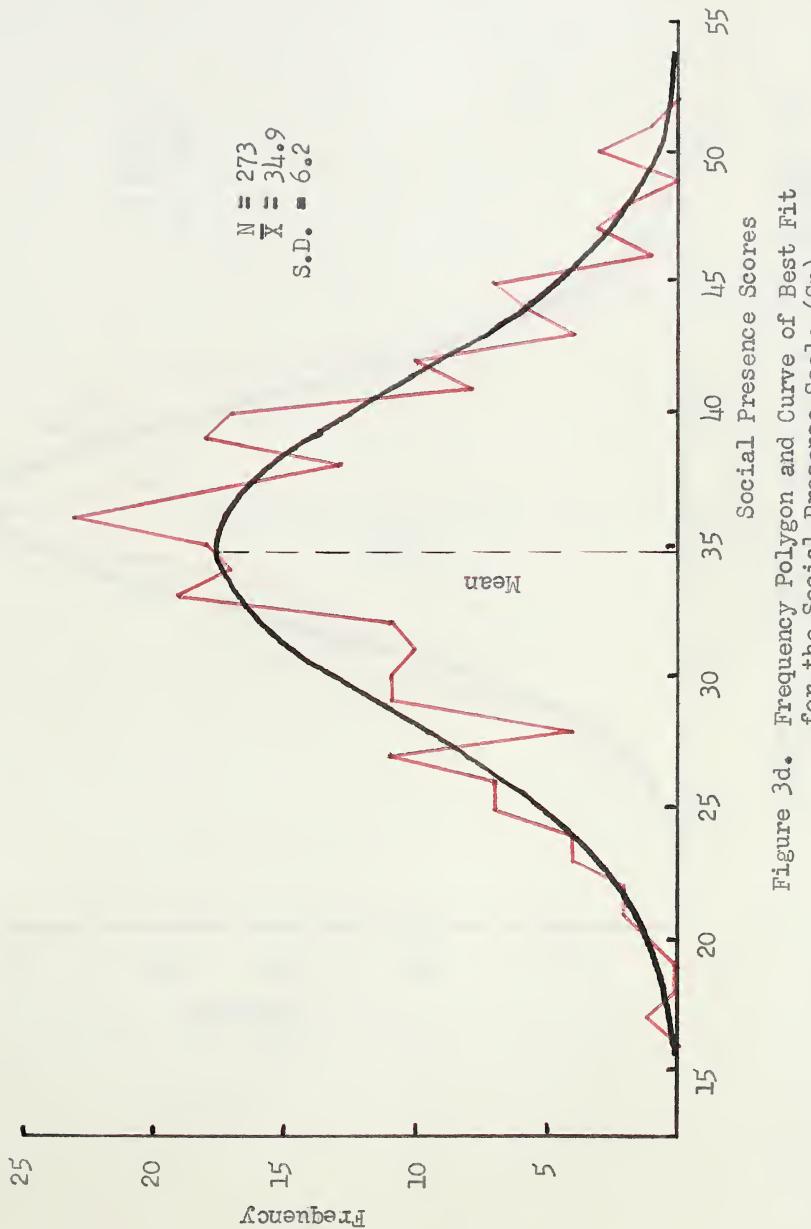
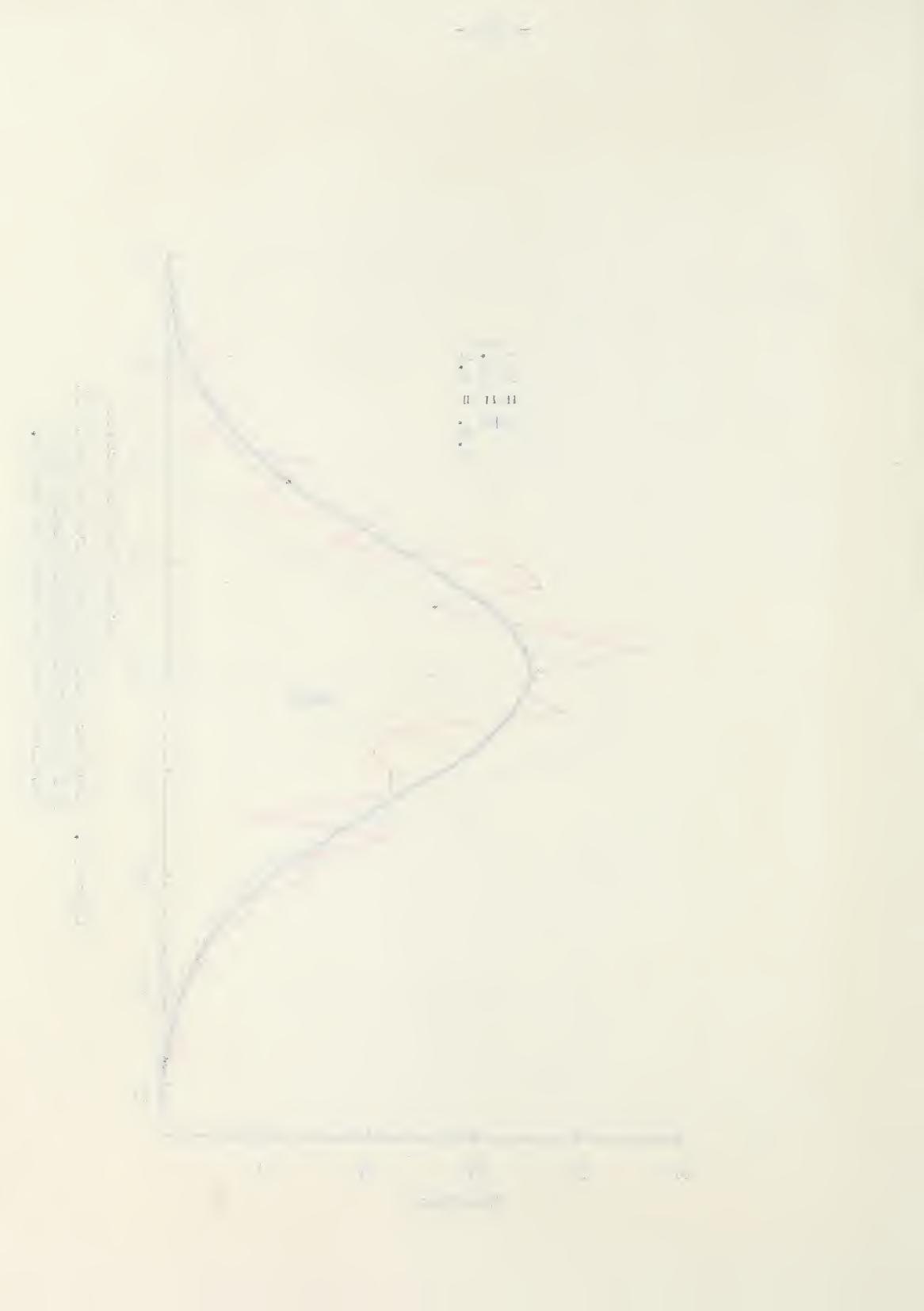


Figure 3d. Frequency Polygon and Curve of Best Fit for the Social Presence Scale (Sp) Obtained from the Normative Sample.



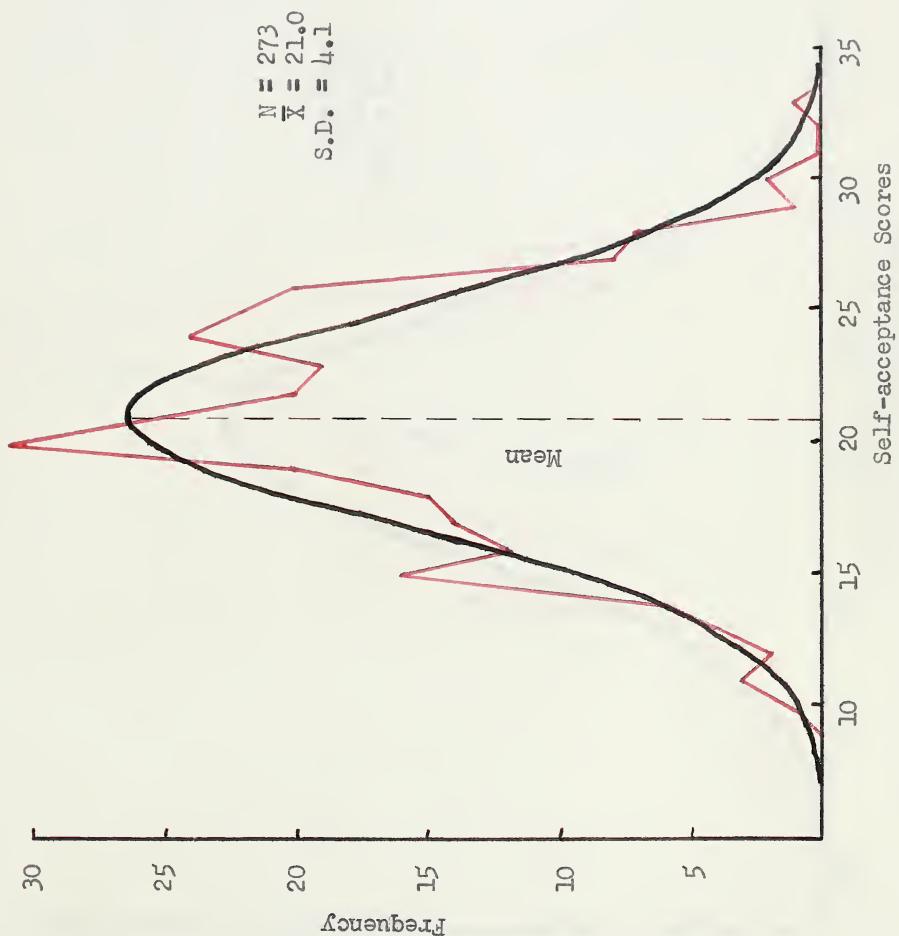
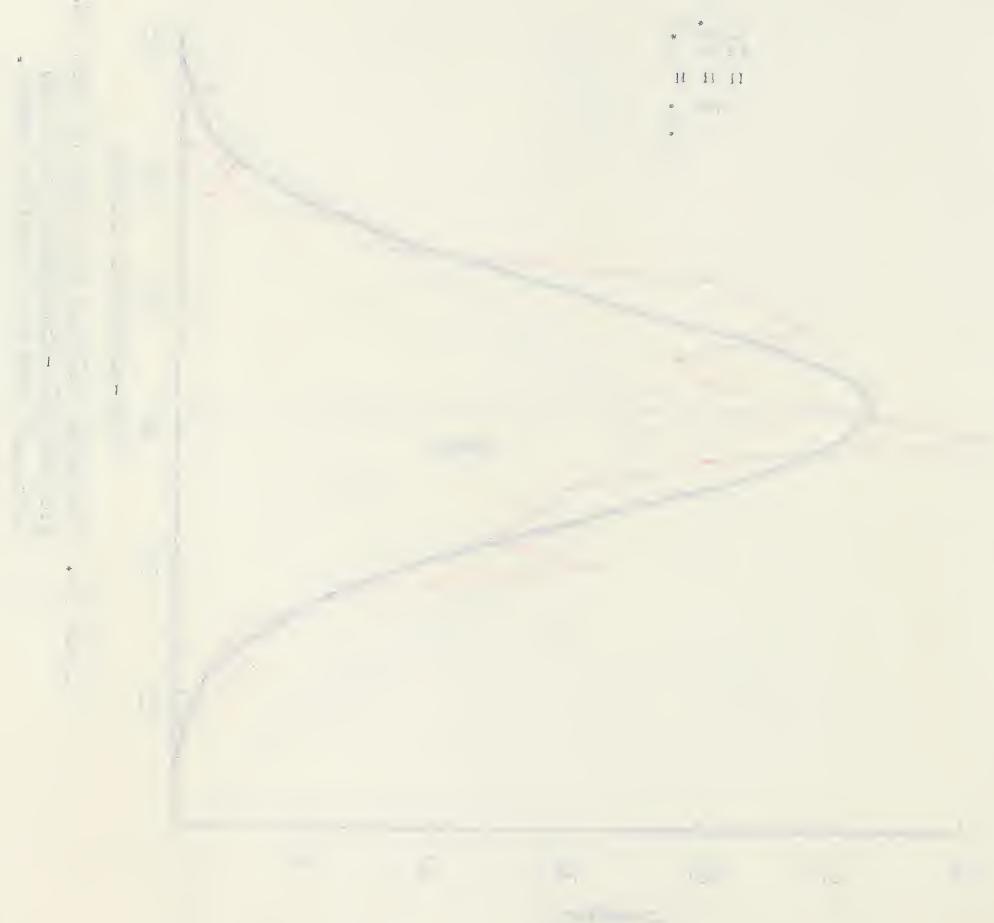


Figure 3e. Frequency Polygon and Curve of Best Fit for the Self-acceptance Scale (Sa) Obtained from the Normative Sample.



H-B-II

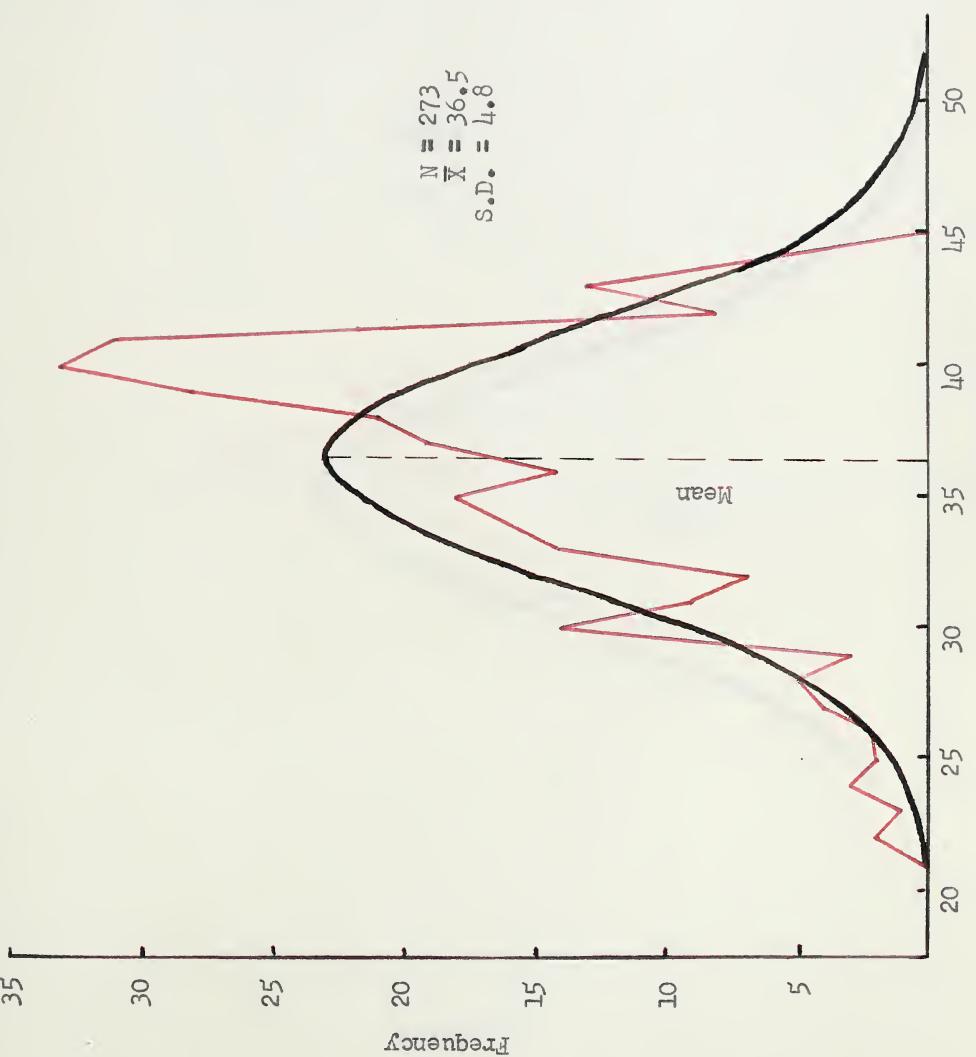


Figure 3f. Frequency Polygon and Curve of Best Fit for the Sense of Well-being Scale (W_B) Obtained from the Normative Sample.

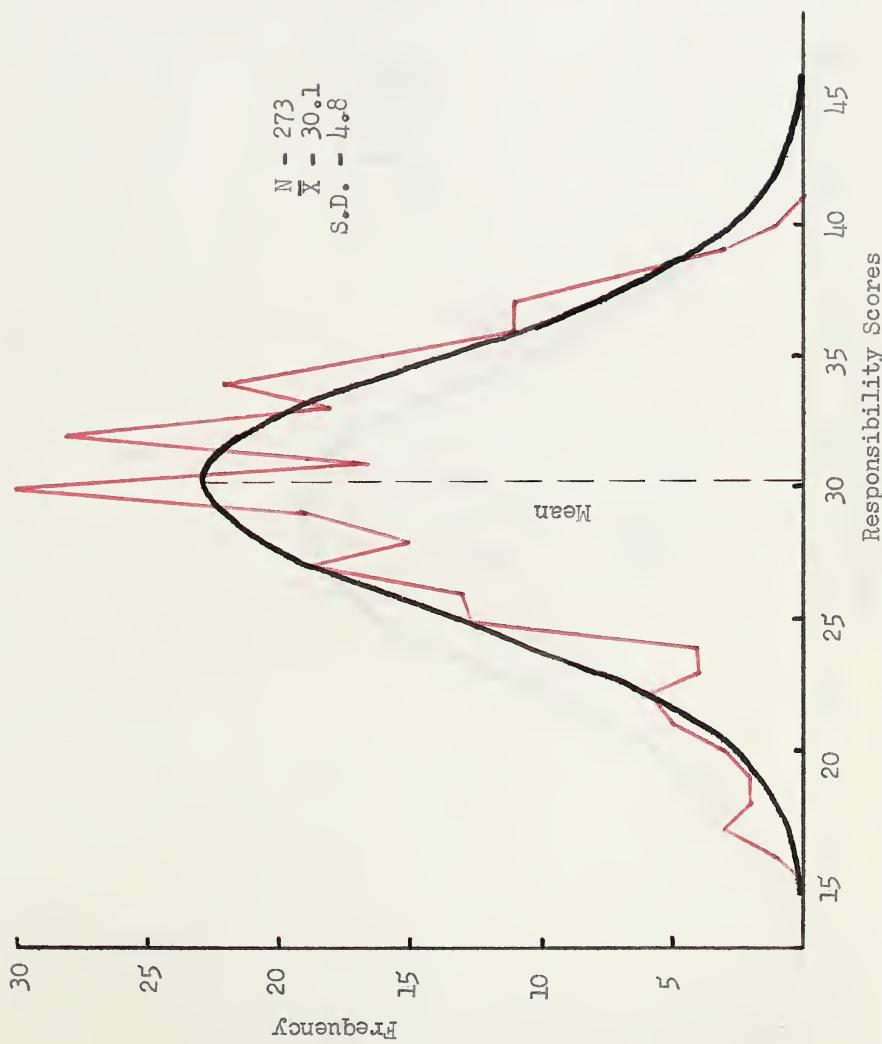


Figure 3g. Frequency Polygon and Curve of Best Fit for the Responsibility Scale (Re) Obtained from the Normative Sample.

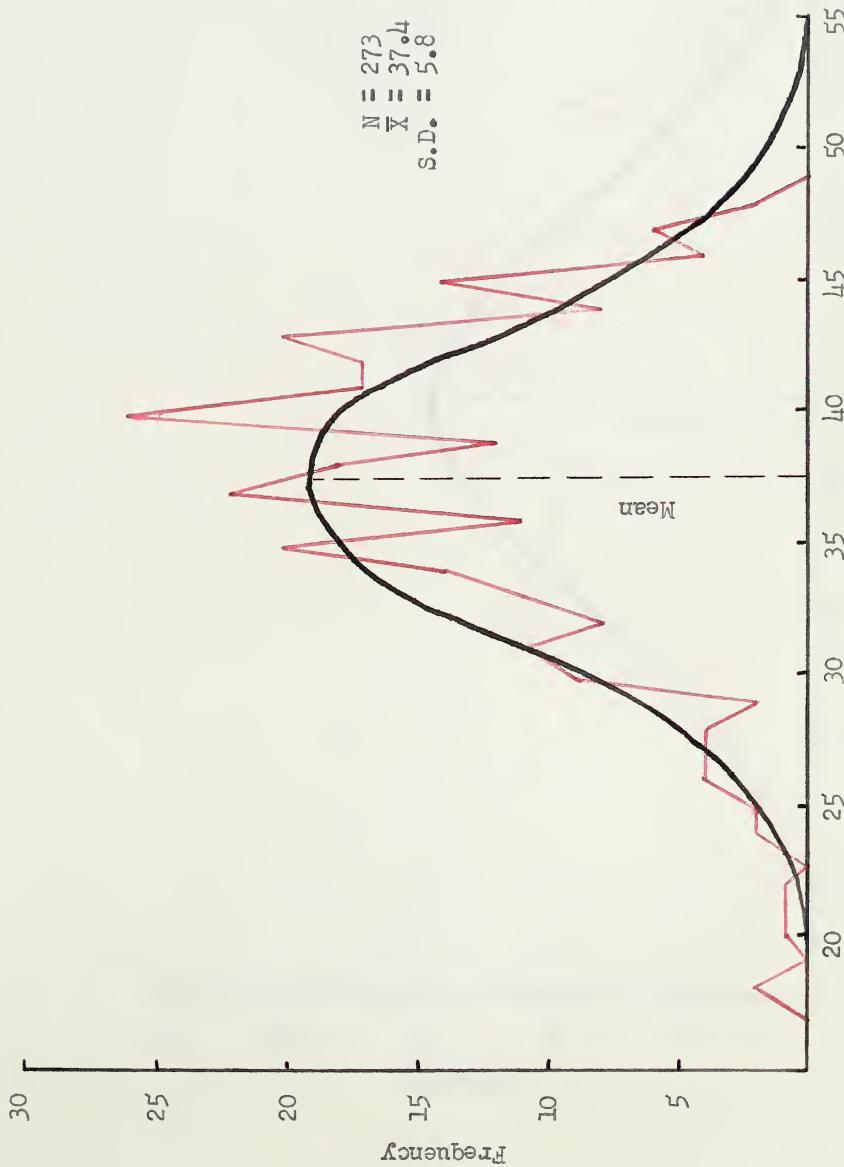


Figure 3h. Frequency Polygon and Curve of Best Fit for the Socialization Scale (So) Obtained from the Normative Sample.

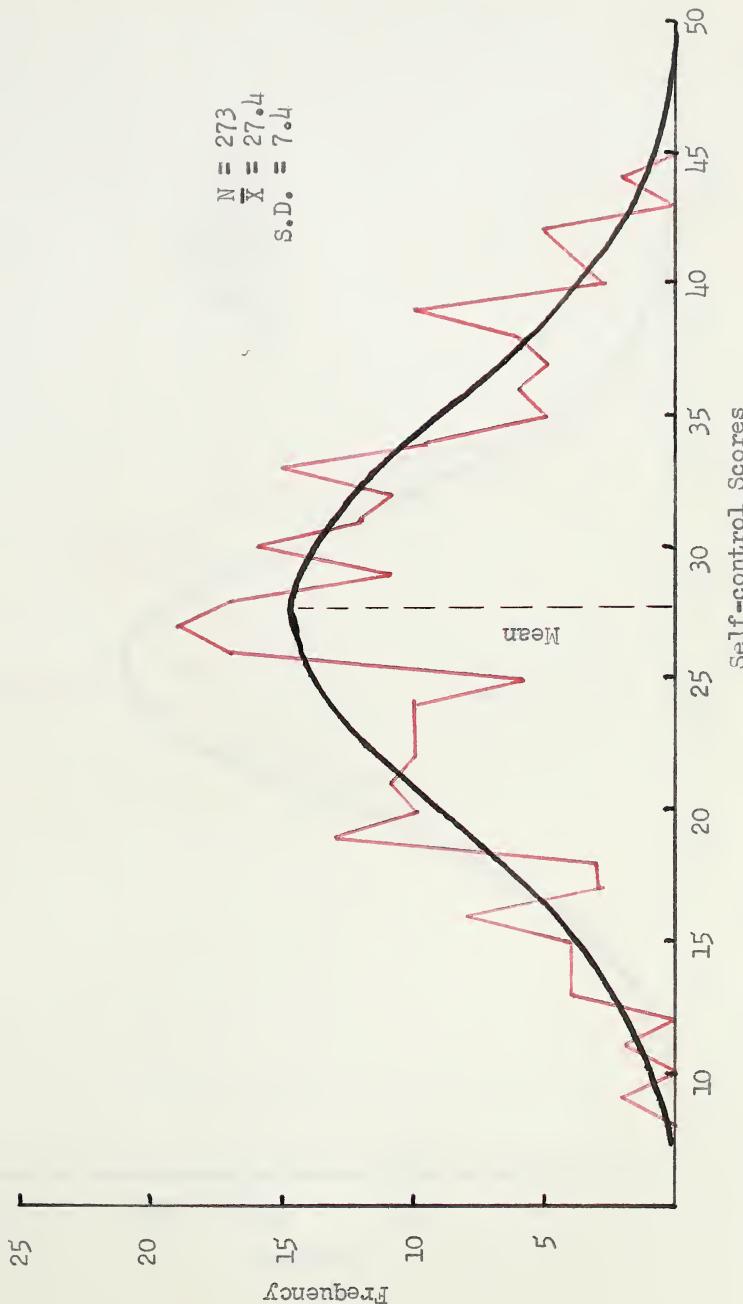
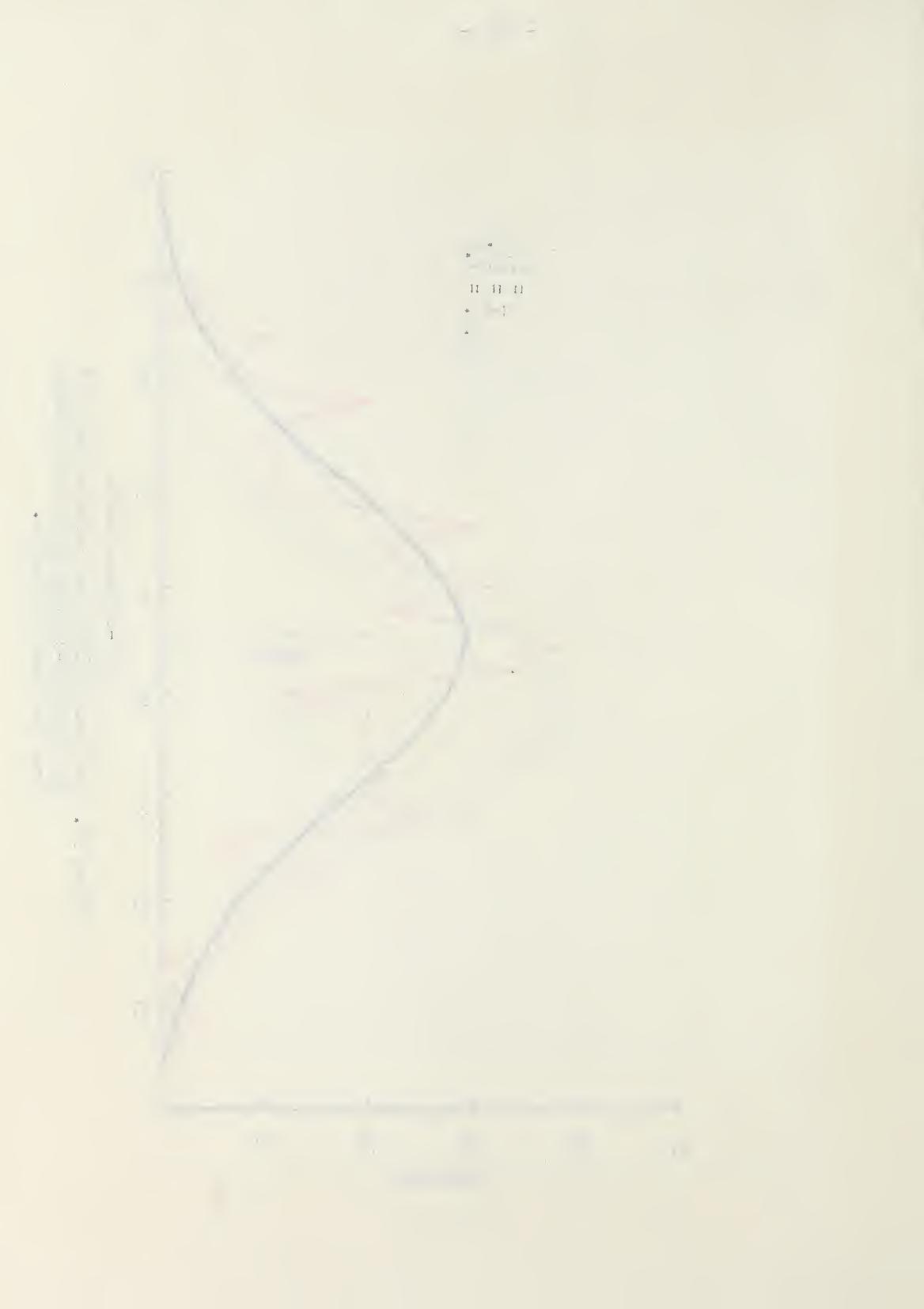


Figure 3i. Frequency Polygon and Curve of Best Fit for the Self-control Scale (Sc) Obtained from the Normative Sample.



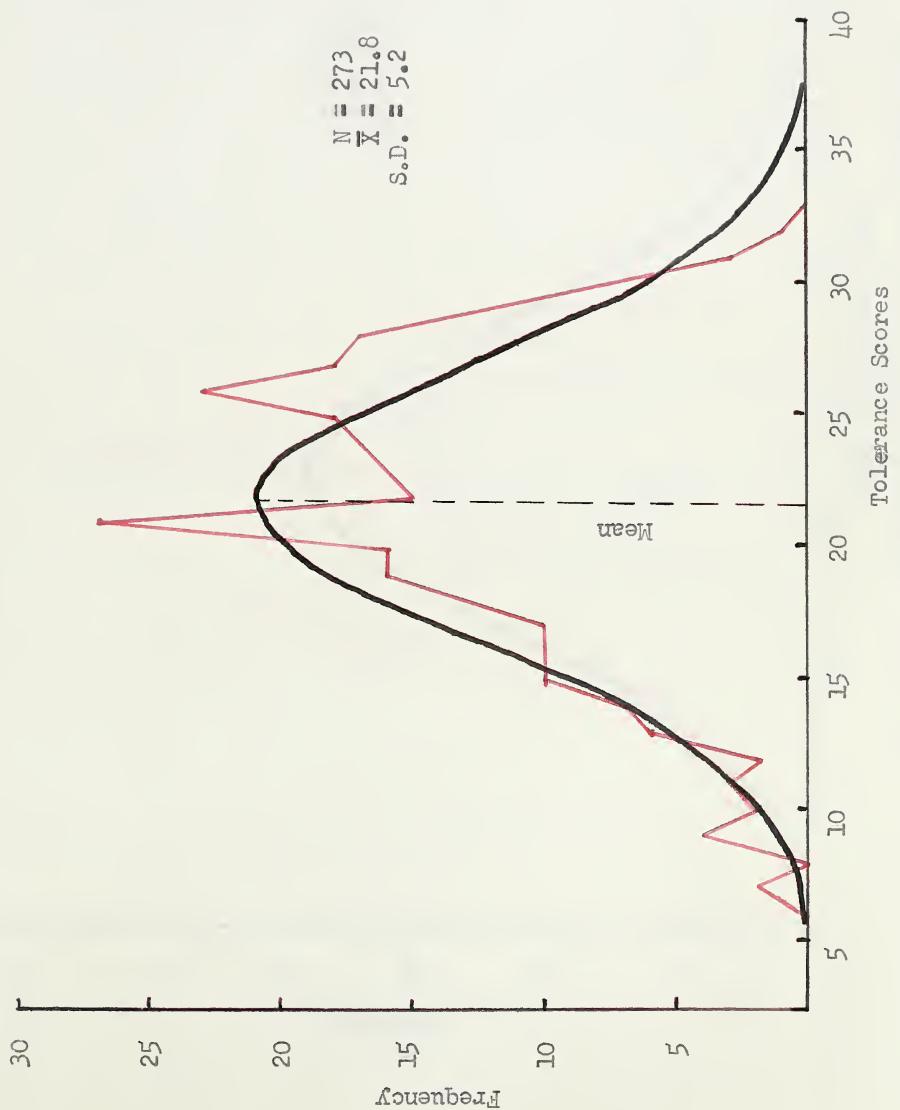


Figure 3j. Frequency Polygon and Curve of Best Fit for the Tolerance Scale (To) Obtained from the Normative Sample.

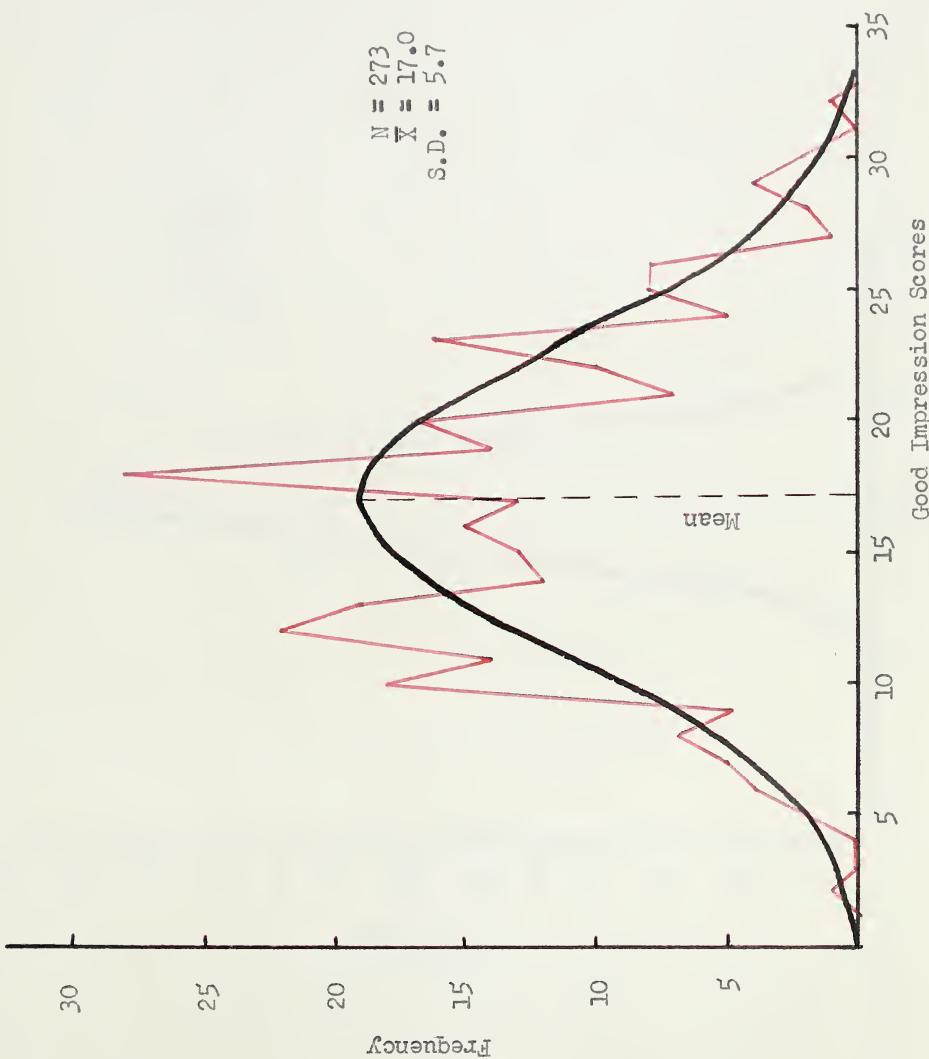


Figure 3k. Frequency Polygon and Curve of Best Fit for the Good Impression Scale (Gi) Obtained from the Normative Sample.

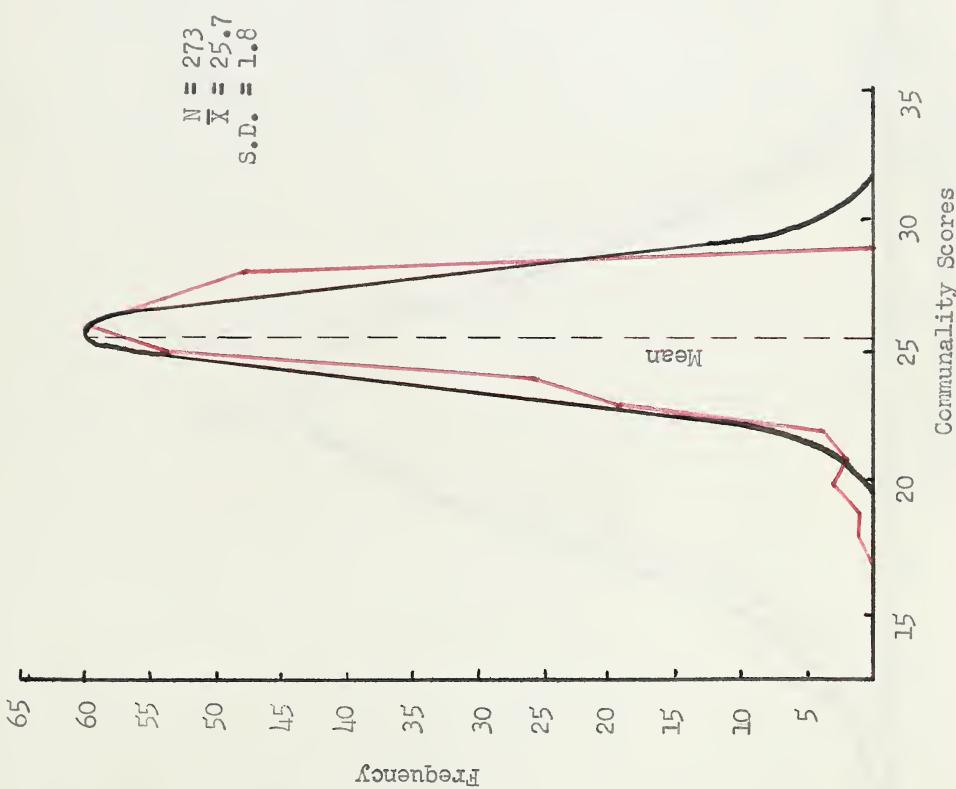


Figure 31. Frequency Polygon and Curve of Best Fit for the Communality Scale (Cm) Obtained from the Normative Sample.

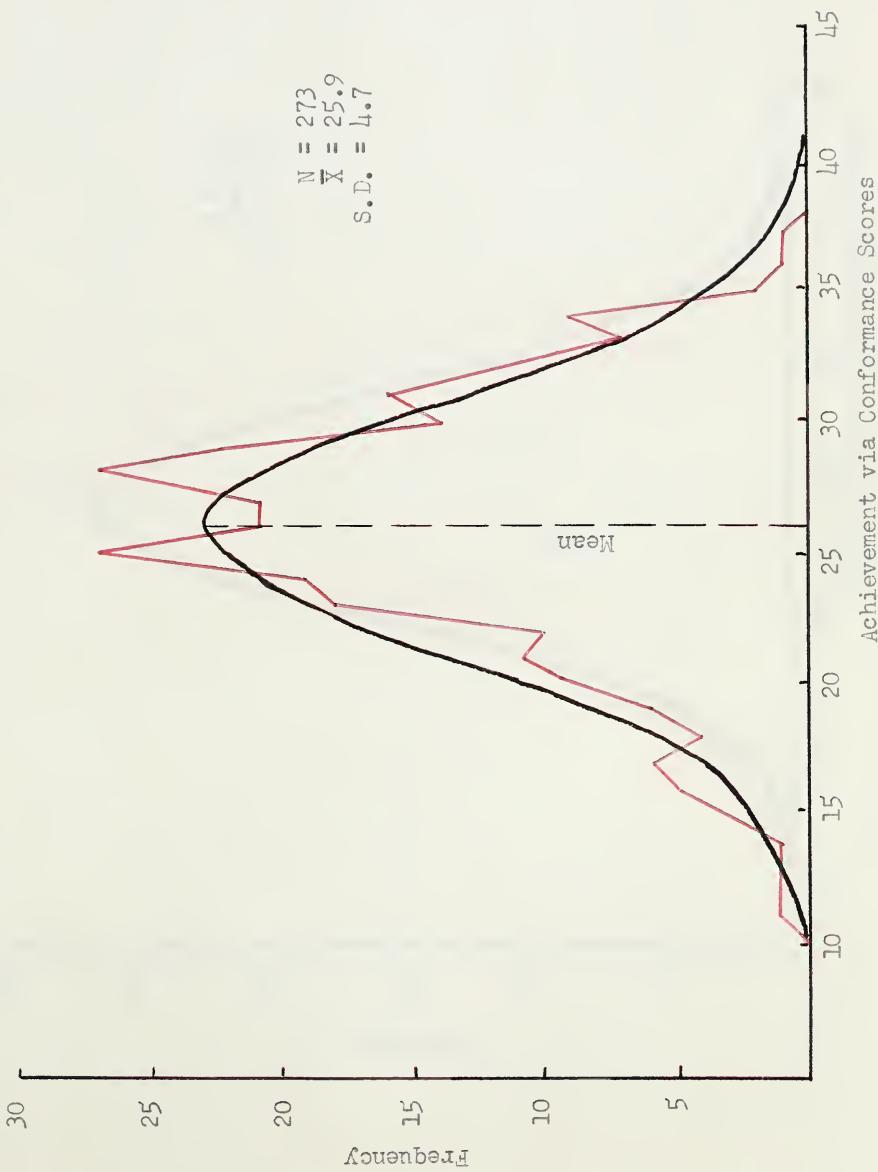


Figure 3m. Frequency Polygon and Curve of Best Fit for the Achievement via Conformance Scale (Ac) Obtained from the Normative Sample.

Figure 3m.

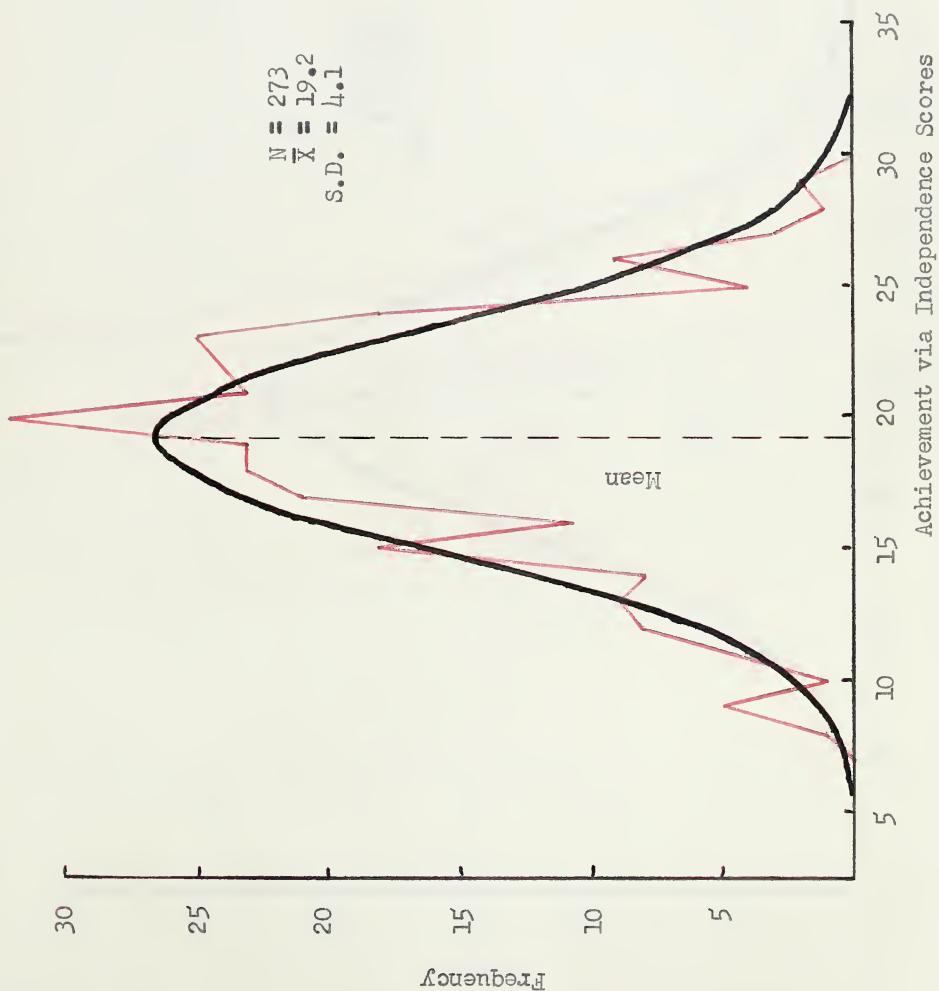


Figure 3n. Frequency Polygon and Curve of Best Fit
for the Achievement via Independence Scale
(Ai) from the Normative Sample.

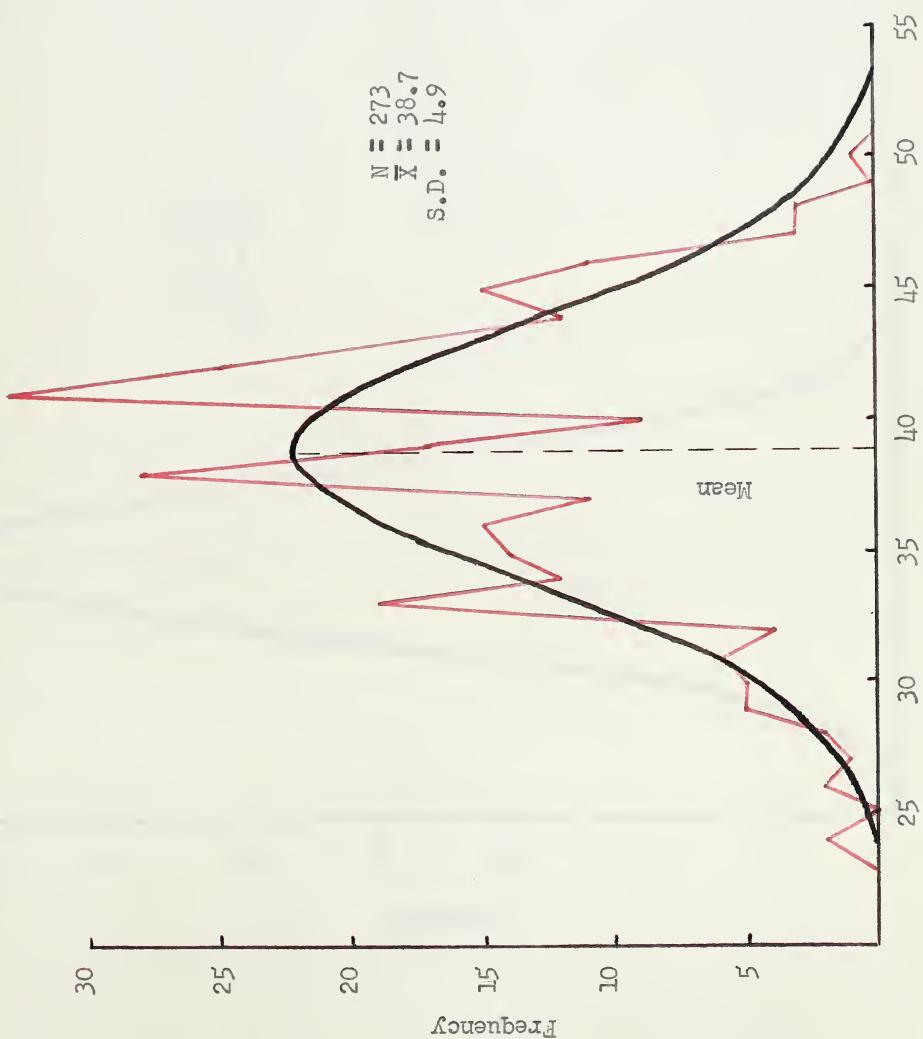


Figure 30. Frequency Polygon and Curve of Best Fit for the Intellectual Efficiency Scale (Te) Obtained from the Normative Sample.

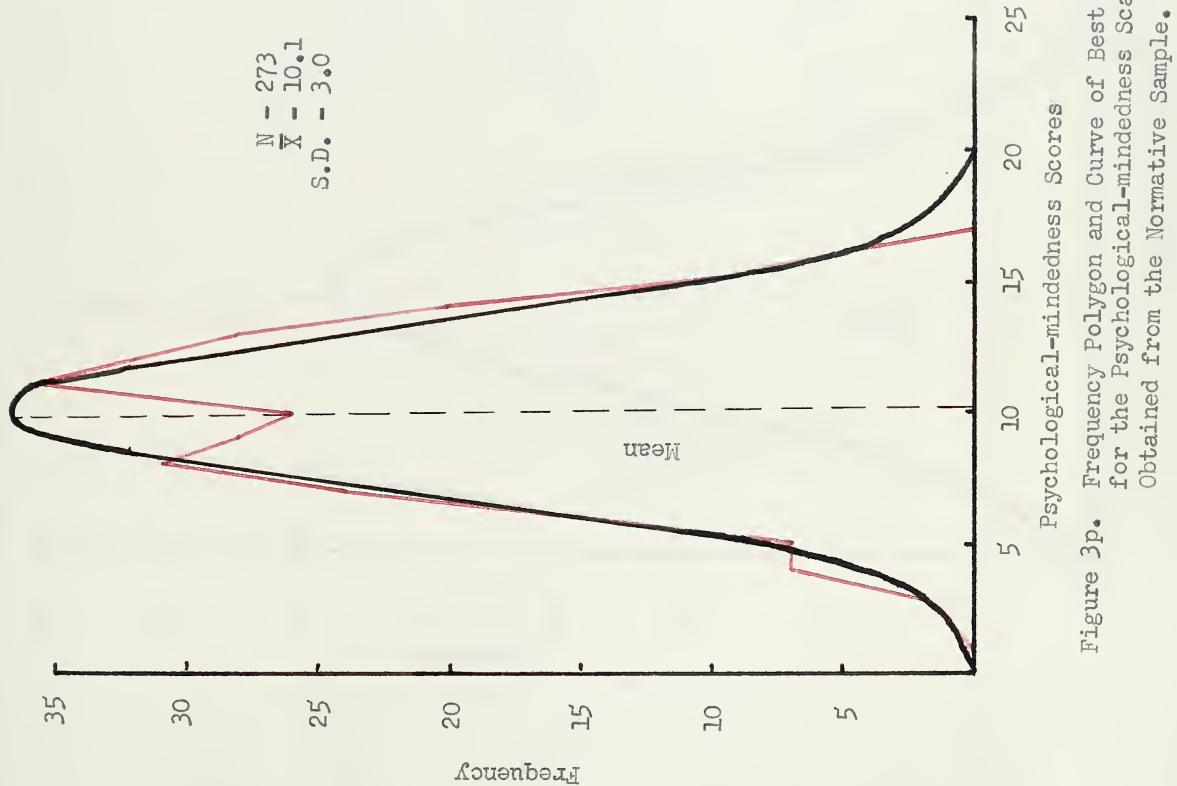


Figure 3p. Frequency Polygon and Curve of Best Fit for the Psychological-mindedness Scale (Py)
Obtained from the Normative Sample.

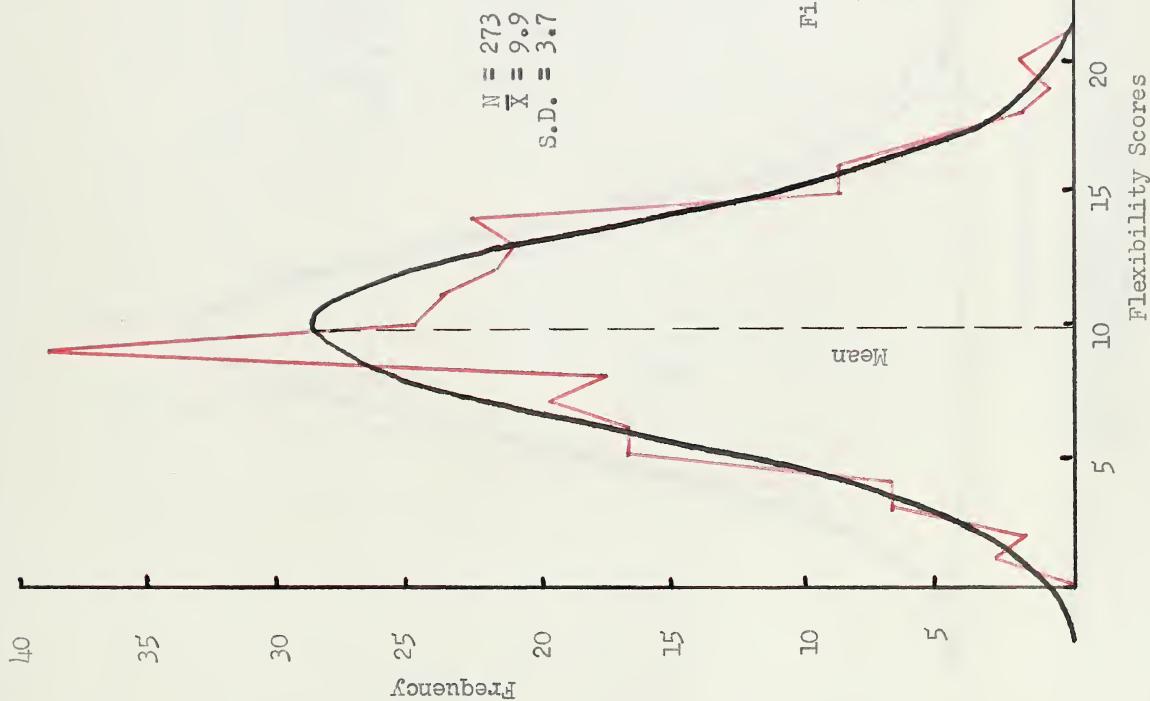


Figure 3q.

Frequency Polygon and Curve
of Best Fit for the Flexibility
Scale (Fx) Obtained from the
Normative Sample.

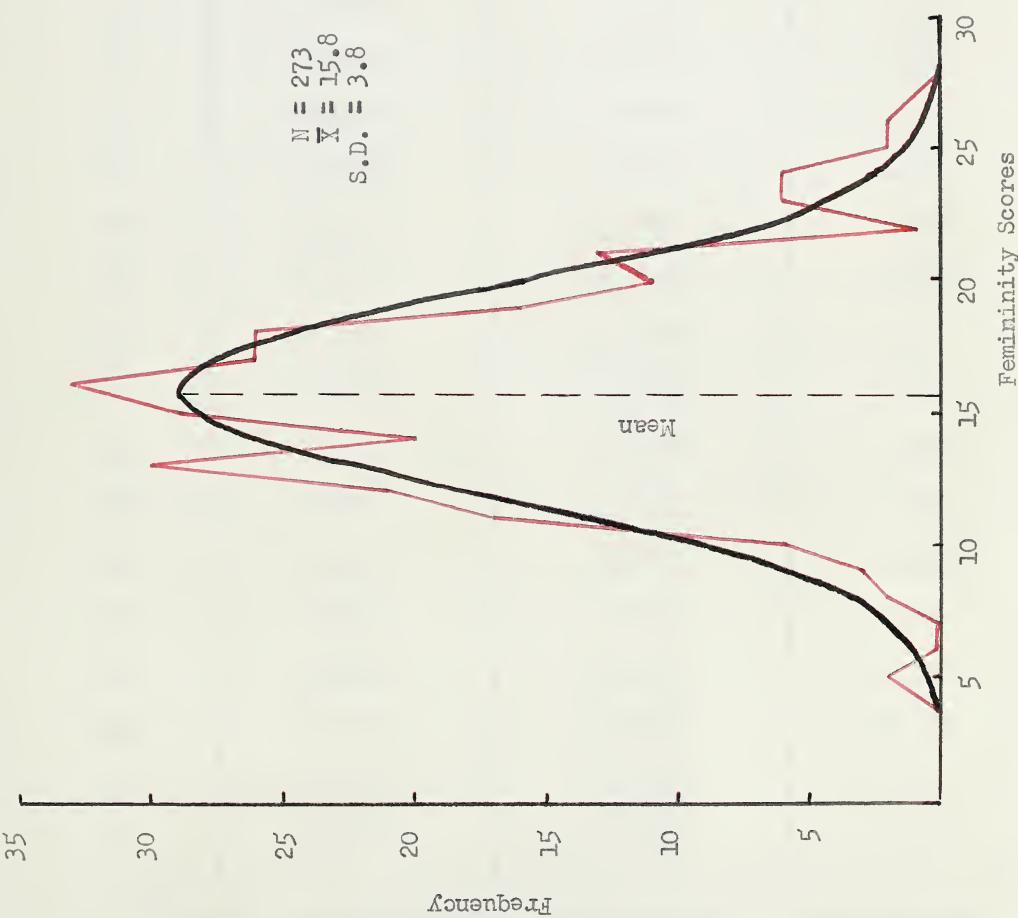


Figure 3r. Frequency Polygon and Curve of Best Fit for the Femininity Scale (Fe) Obtained from the Normative Sample.

TABLE 10

CORRELATION OF SCALE MEANS WITH FIRST YEAR AVERAGE
OF STUDENTS IN THE NORMATIVE SAMPLE (N= 260)

Scale	Correlation ^a "r"	Standard Error	Critical Ratio
Do	-0.015	0.062	0.24
Cs	-0.098	0.062	1.58
Sy	-0.037	0.062	0.60
Sp	-0.095	0.062	1.53
Sa	-0.033	0.062	0.53
Wb	0.038	0.062	0.61
Re	0.123	0.061	1.98 ^b
So	0.137	0.056	2.21 ^b
Sc	0.072	0.062	1.16
To	0.011	0.062	0.18
Gi	0.035	0.062	0.56
Cm	0.084	0.062	1.35
Ac	0.144	0.061	2.32 ^b
Ai	0.022	0.062	0.35
Ie	0.086	0.062	1.39
Py	0.119	0.061	1.92
Fx	-0.268	0.057	4.32 ^c
Fe	0.126	0.061	2.03 ^b

^aPearson product-moment coefficients of correlation.

^bSignificant at the 5% level.

^cSignificant at the 1% level.

Note: A C.R. of 1.96 is required for significance at the 5% level, and of 2.58 for significance at the 1% level.

3. Further Enquiries.

a) The only significant difference between means on the various scales of the CPI for the nineteen Category IV probation students and the corresponding matched non-probation students was on the So scale. (See Table 11) Figure 4 illustrates the similarity of the profiles for each of these samples.

b) A significant difference was found between means on the Ac and Ie scales for the twelve non-probation students with averages of 65% or better and the corresponding matched probation students. (See Table 12) With the exception of the Cm scale, the non-probation sample means were consistently higher than the corresponding probation sample means. (See Figure 5)

c) The only significant differences between means on the eighteen scales of the CPI for the forty-nine normative students with first year averages of 70% or better as compared with the forty-one normative students with first year averages below 50% were on the Ac and Fe scales. (See Table 13) The similarity of the profiles is illustrated in Figure 6.

TABLE 11

MEANS FOR PROBATION AND NON-PROBATION SAMPLES OF
NINETEEN STUDENTS EACH, WITH INDICATIONS OF
SIGNIFICANCE OF DIFFERENCE

Scale	Probation Sample Mean	Non-Probation Sample Mean	t Test of Significance Between Means
Do	24.00	23.74	0.128
Cs	17.58	16.63	1.173
Sy	23.84	22.42	0.935
Sp	34.89	33.79	0.308
Sa	19.68	19.32	0.187
Wb	36.63	36.32	0.188
Re	29.89	30.00	0.068
So	35.74	39.58	2.999*
Sc	27.47	29.37	0.656
To	21.42	21.61	0.183
Gi	17.21	16.32	0.479
Cm	25.89	25.58	0.595
Ac	24.74	26.53	1.619
Ai	18.47	18.79	0.213
Ie	38.32	38.74	1.315
Py	10.21	10.58	0.512
Fx	10.05	9.05	1.132
Fe	15.32	16.68	0.551

* Significant at the 1% level.

Note: With 18 degrees of freedom the following "t" values are required for significance: 5% level - 2.101
1% level - 2.878

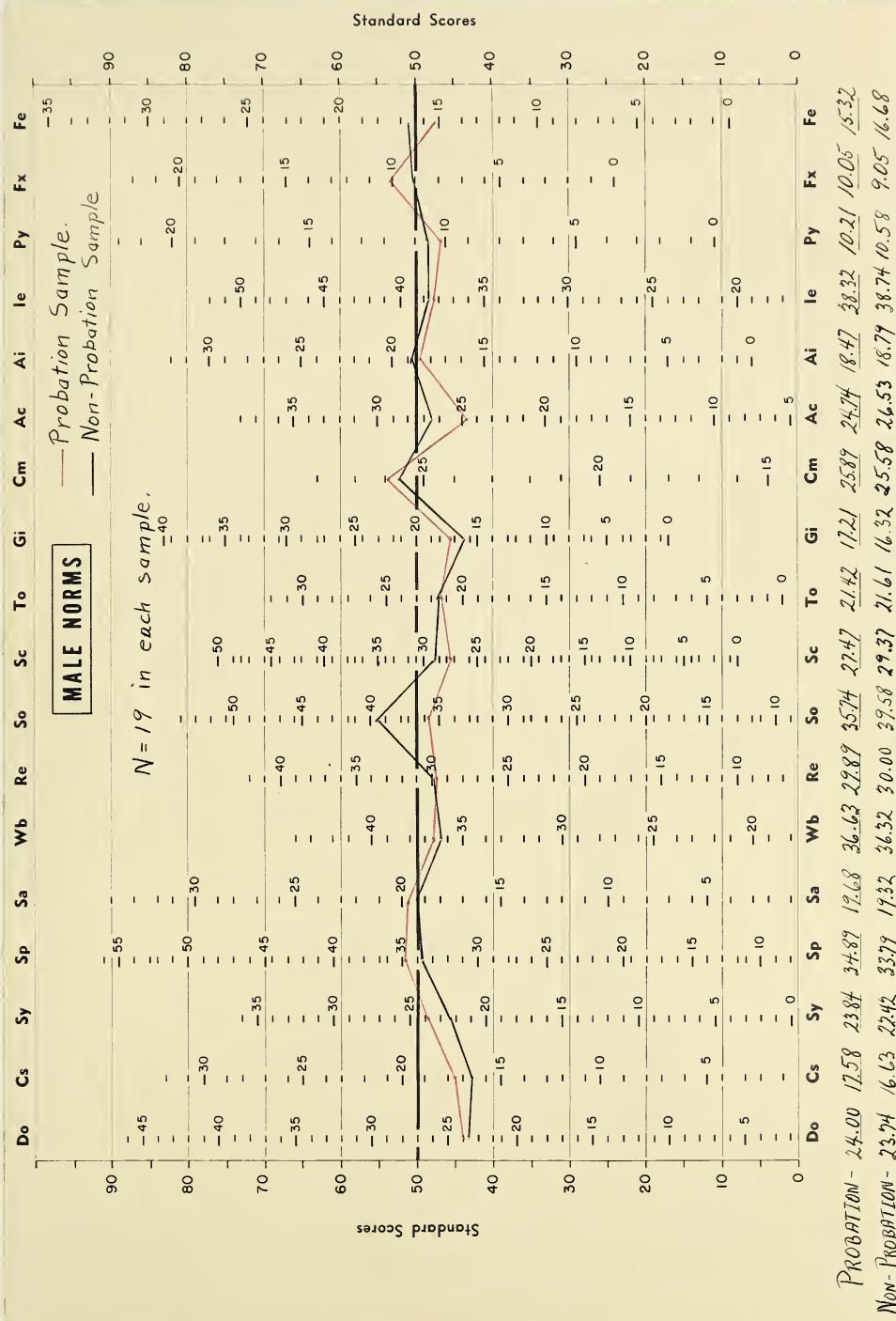


Figure 4. Means for Nineteen Matched Pairs of Probation and Non-Probation Students Plotted on Gough's Profile Sheet.

TABLE 12

MEANS FOR PROBATION AND NON-PROBATION SAMPLES OF
TWELVE STUDENTS EACH, WITH INDICATIONS OF
SIGNIFICANCE OF DIFFERENCE

Scale	Probation Sample Mean	Non-Probation Sample Mean	t Test of Significance Between Means
Do	25.58	25.92	0.141
Cs	17.50	18.08	0.420
Sy	22.42	24.17	1.101
Sp	32.83	35.08	1.098
Sa	19.92	20.67	0.429
Wb	35.83	38.75	1.453
Re	29.92	31.42	0.694
So	37.83	40.50	0.930
Sc	27.33	29.58	0.574
To	21.08	24.00	1.587
Gi	17.50	18.42	0.352
Cm	25.75	24.42	1.547
Ac	23.75	27.75	2.777 ^a
Ai	18.25	21.58	2.162
Ie	38.08	41.42	3.220 ^b
Py	10.75	11.50	0.806
Fx	8.00	10.58	1.697
Fe	16.42	16.67	1.232

^aSignificant at the 2% level.

^bSignificant at the 1% level.

Note: With 11 degrees of freedom the following "t" values are required for significance: 5% level - 2.201
2% level - 2.718
1% level - 3.106

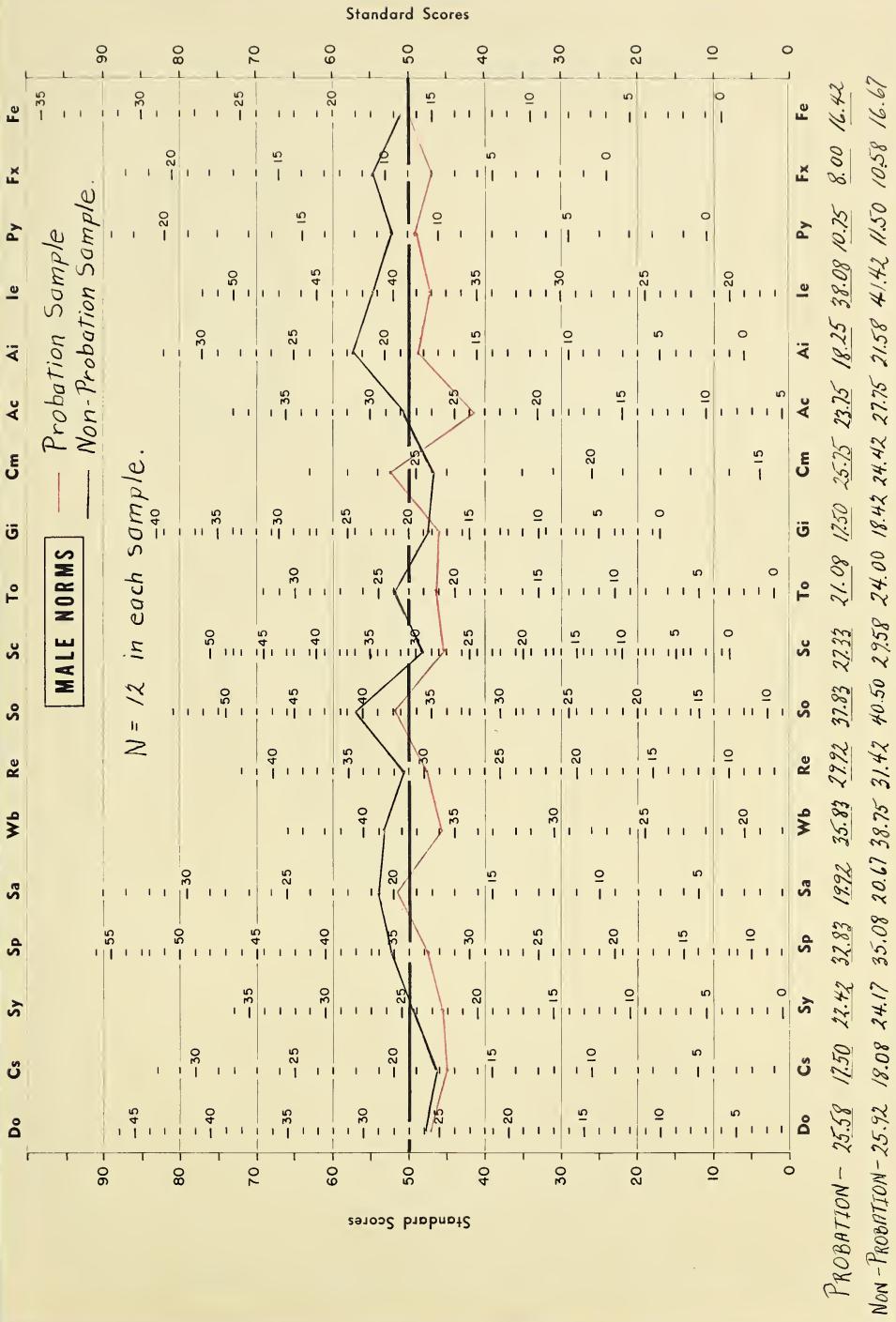


Figure 5. Means for Twelve Matched Pairs of Probation and Non-Probation Students Plotted on Gough's Profile Sheet.

TABLE 13

MEANS, STANDARD DEVIATIONS, AND SIGNIFICANCE OF DIFFERENCE
BETWEEN MEANS OF NORMATIVE SAMPLE STUDENTS WHOSE FIRST
YEAR AVERAGES WERE 70% OR BETTER (N=49), AND THOSE
WHOSE AVERAGES WERE BELOW 50% (N=41)

Scale	Below 50% Sample		70% or Better Sample		t Test of Significance Between Means
	Mean	S.D.	Mean	S.D.	
Do	25.07	5.61	26.06	5.81	0.811
Cs	18.44	3.71	17.37	3.60	1.363
Sy	24.54	4.21	23.03	4.91	1.546
Sp	35.90	6.47	33.63	5.59	1.733
Sa	20.76	3.66	20.43	3.67	0.420
Wb	35.93	4.75	36.45	4.91	0.505
Re	29.44	5.26	30.76	4.98	1.200
So	36.73	6.05	38.10	5.63	1.092
Sc	26.20	7.33	27.94	7.22	1.115
To	21.41	5.55	21.73	4.99	0.281
Gi	16.20	5.29	16.39	5.59	0.164
Cm	25.29	1.89	25.94	1.71	1.667
Ac	24.73	4.63	26.78	4.61	2.071 ^a
Ai	19.07	4.42	19.39	3.84	0.360
Ie	37.85	5.59	39.20	4.58	1.262
Py	9.54	3.26	10.31	2.99	1.149
Fx	10.39	4.22	9.78	3.08	0.763
Fe	14.56	3.19	16.33	3.67	2.425 ^b

^aSignificant at the 5% level.

^bSignificant at the 2% level.

Note: Values of "t" required for significance: 5% level - 1.960
2% level - 2.326
1% level - 2.576

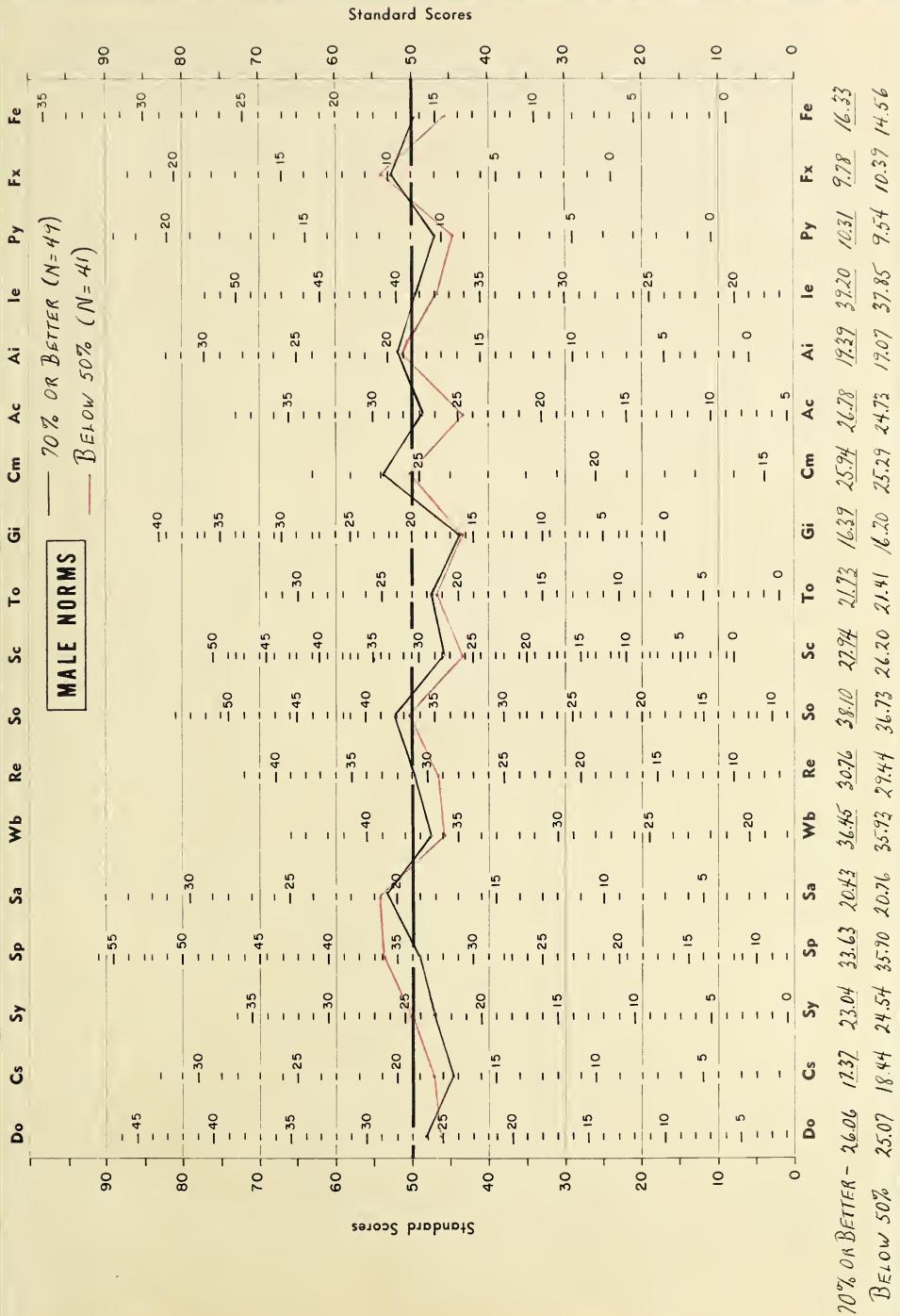


Figure 6. Means for Normative Students With First Year Averages of 70% or Better, and Means for Those With Averages Below 50%, Plotted on Gough's Profile Sheet.

DISCUSSION OF RESULTS

1. Matched Probation and Non-Probation Samples.

The original hypothesis - that one or more of the CPI scales would serve to differentiate between adequate and underachievers - was not substantiated by the results obtained for the matched probation and non-probation samples. However, analysis of final examination results (not available until after the thesis testing had been completed) indicated that the probation and non-probation samples were not discrete samples of underachievers and adequate achievers. The mean first year average for the 36 of the 47 students in the probation sample who wrote final examinations was 48.1%, while that for the 47 non-probation students was 59.4%. "Probation" was the sole criterion used to select the members of the samples. No attempt was made to eliminate students from the non-probation sample who failed one or more, but fewer than half, of their December examinations. Had this been done, the size of each of the matched samples would have been reduced considerably. It was considered desirable to have samples of at least 40 students each.

The final examination results would undoubtedly have been a better criterion for distinguishing between adequate achievers and underachievers. A mid-session criterion, i.e. probation, was used as it was necessary to administer the inventory during the session when the freshman students

were readily available for participation in the study. Some consideration was given to the use of second year students, with the first year average being used as the criterion of achievement. However, the majority of the students who failed their first year (half or more of their subjects) were denied immediate readmission to the University, and hence were not available for participation in the study.

In view of the fact that the samples were not discrete samples of adequate achievers and underachievers, it is evident that this section of the study did not test the hypothesis as outlined.

2. Normative Sample.

The scale means obtained on the normative sample and those reported by Gough (8, p. 34) on a sample of 680 American college students were plotted on Gough's profile sheet for the purpose of comparison. (See Appendix "D") Apart from the first two scales (Do and Cs), and the last six scales (Ac through Fe), the mean profiles for the two samples were very similar.

Contrary to the results reported by Gough (See p. 15), the coefficient of correlation obtained in this research between the Achievement-via-Independence scale (Ai) and grades was near zero and not statistically significant. Since the sample employed in this research (260) was large enough to suggest that the size of the sample was

not a significant factor in producing this difference, it may be that cultural factors apply.

The most significant correlation obtained between the various scales on the CPI and first year averages was that of Flexibility (Fx). The obtained coefficient of correlation was low, however, and suggests only a low negative relationship with academic performance. It has been the writer's observation, in his work as a counsellor of students, that some students who are poor achievers obtain scores on the Fx scale that are more than one standard deviation above the mean. It may be that such individuals are rebellious and, perhaps, idealistic, and may not, therefore, apply themselves effectively to their studies. This is only a tentative suggestion.

It may also be that a combination of variables made up of factors contained in the Re, So, Ac and Fe scales may be an indicator of academic achievement, since the obtained coefficients of correlation between these several scales and first year averages were positive and significant, if low.

3. Further Enquiries.

While the main research project was not productive of positive results, the results obtained in the further enquiries would suggest that, with an improved criterion of academic achievement, and with large sample research, positive findings may result. One such method might be to

administer the CPI to a sufficiently large number of first year students so that, once the results of their work in that year were available, it would be possible to match a sufficiently large number of them to properly test the original hypothesis.

VI

CONCLUSIONS

1. In terms of the criterion of difference employed in the main research project, none of the scales of the California Psychological Inventory was found to differentiate between adequate achievers and under-achievers.
2. In view of the results obtained in the additional enquiries, it is evident that the criterion of difference employed, probation as against non-probation, was not a good one.
3. There is some suggestion that research involving the So, Ac, Ie, and Fe scales may be productive of useful results.

VII

SUGGESTIONS FOR FURTHER RESEARCH

1. Research involving a more satisfactory criterion of difference between good and poor achievement may be productive of useful results. In this regard, the testing of a large number of students during first year, with the ability to match from this large sample after final examination results are available, may be one improvement over the present research.
2. Research involving the So, Ac, Ie, and Fe scales appears to be indicated.

BIBLIOGRAPHY

1. BRESEE, CLYDE W. "Affective Factors Associated With Academic Underachievement in High School Students"; Dissertation Abstracts, 1957, 17, pp. 90-91 (Abstract)
2. CASH, WILLIAM L. "Relation of Personality Traits to Scholastic Aptitude and Academic Achievement of Students in a Liberal Protestant Seminary"; Dissertation Abstracts, 1954, 14, pp. 630-631 (Abstract)
3. CHAPMAN, HAROLD M. "The Prediction of Freshman Scholarship from a Combination of Standardized Test Scores and High School Grades"; Dissertation Abstracts, 1955, 15, p. 1201 (Abstract)
4. CLARKE, S.C.T. and McGREGOR, J.R. "Teacher's Adjustment and Teacher's Achievement in University Courses"; Canad. J. Psychol., 1955, 9, pp. 55-58
5. DARLEY, J.G. "Scholastic Achievement and Measured Maladjustment"; J. appl. Psychol., 1937, 21, pp. 485-493
6. DROUGHT, NEAL E. "An Analysis of Eight Measures of Personality and Adjustment in Relation to Relative Scholastic Achievement"; J. appl. Psychol., 1938, 22, pp. 597-606

7. GOUGH, H.G. The California Psychological Inventory.
Palo Alto, California: Consulting Psychologists
Press, Inc., 1957
8. GOUGH, H.G. Manual for the California Psychological
Inventory. Palo Alto, California: Consulting
Psychologists Press, Inc., 1957
9. GOUGH, H.G. "The Construction of a Personality
Scale to Predict Scholastic Achievement";
J. appl. Psychol., 1953, 37, pp. 361-366
10. GOUGH, H.G. "What Determines the Academic Achievement
of High School Students?"; J. of Educ. Res.,
1953, 46, pp. 321-331
11. HATHAWAY, S.R. and MCKINLEY, J.C. The Minnesota
Multiphasic Personality Inventory. Minneapolis,
Minnesota: University of Minnesota Press, 1943
12. HOYT, DONALD P. and NORMAN, WARREN T. "Adjustment
and Academic Predictability"; J. counsel. Psychol.,
1954, 1, pp. 96-99
13. KNAAK, NANCY K. "A Study of the Characteristics
of Academically Successful and Unsuccessful
Freshman Women Who Entered Northwestern
University in the Fall of 1954"; Dissertation
Abstracts, 1957, 17, pp. 304-305 (Abstract)
14. SCHOFIELD, WILLIAM "A Study of Medical Students
With the MMPI: III Personality and Academic
Success"; J. appl. Psychol., 1953, 37, pp. 47-52

15. THOMPSON, J.S. "A Study of the Relationship Between Certain Measured Psychological Variables and Achievement in the First Year of Theological Seminary Work"; Dissertation Abstracts, 1956, 16, pp. 1846-1847 (Abstract)
16. VAN DALSEM, ELIZABETH L. "Factors Related to Low Achievement in High School English"; Dissertation Abstracts, 1956, 16, pp. 1233-1234 (Abstract)

STUDENT ADVISORY SERVICES



EDMONTON, ALBERTA
CANADA

APPENDIX "A"

Copy of Letter to Students
Inviting Participation in
the Study.

This is to invite you to participate in a study being carried out by Mr. D. C. Fair of this Department. Your name has been selected at random from the total list of first year male students. Over three hundred students are being asked to assist.

All that is required of you is the completion of an inventory requiring about an hour of your time. Please call at the Administration Building, Room 111 (East Entrance) on at 1:00 p.m. for a few minutes. At this time Mr. Fair will discuss the purpose of the study and arrange a time for taking the inventory at your convenience. If you are unable to attend please call Mr. Fair at 369385 or leave word at the office.

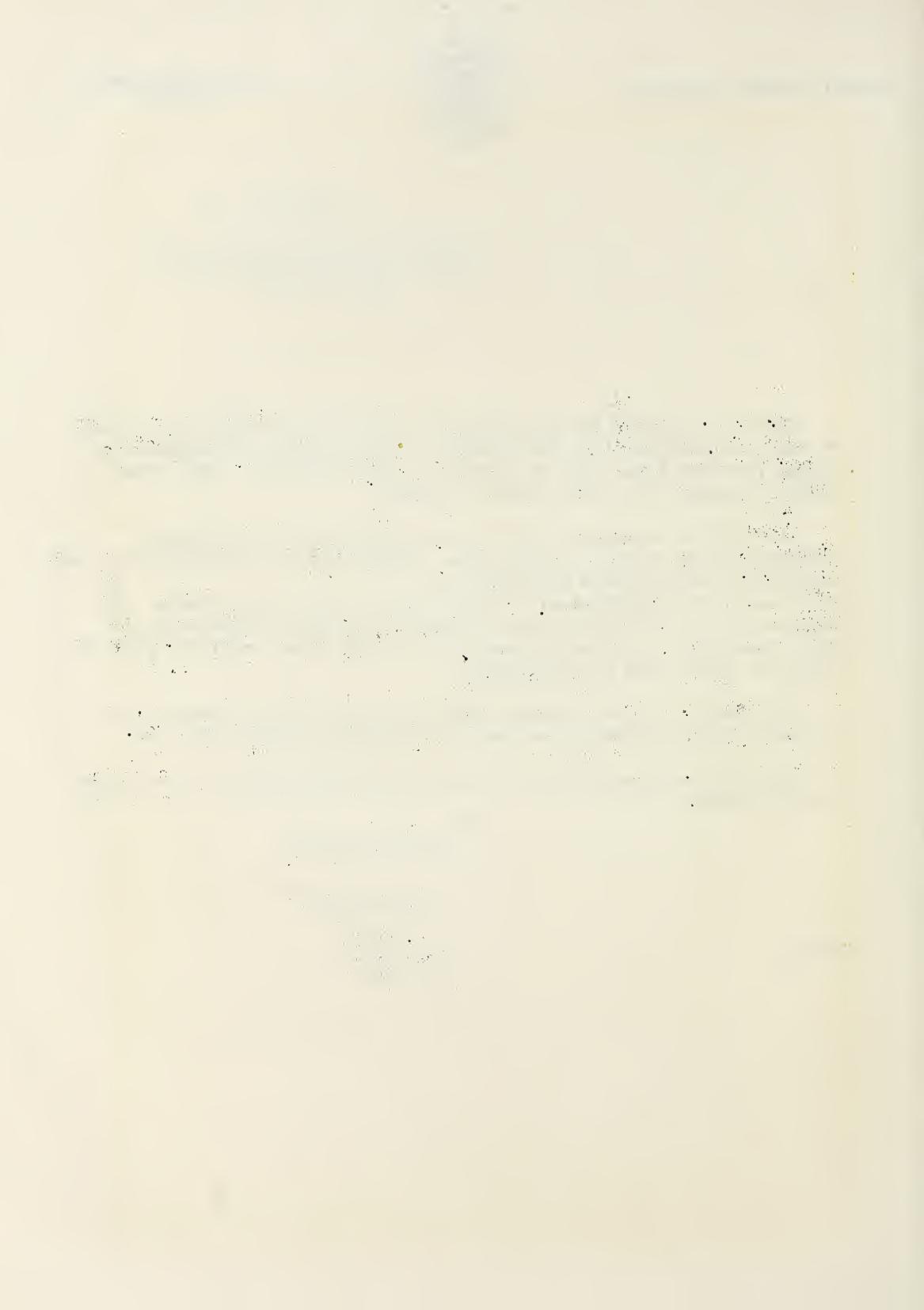
The results of the Inventory will be treated as confidential, but if you wish Mr. Fair will be glad to discuss the results with you.

We would very much appreciate your cooperation with us in carrying out this study.

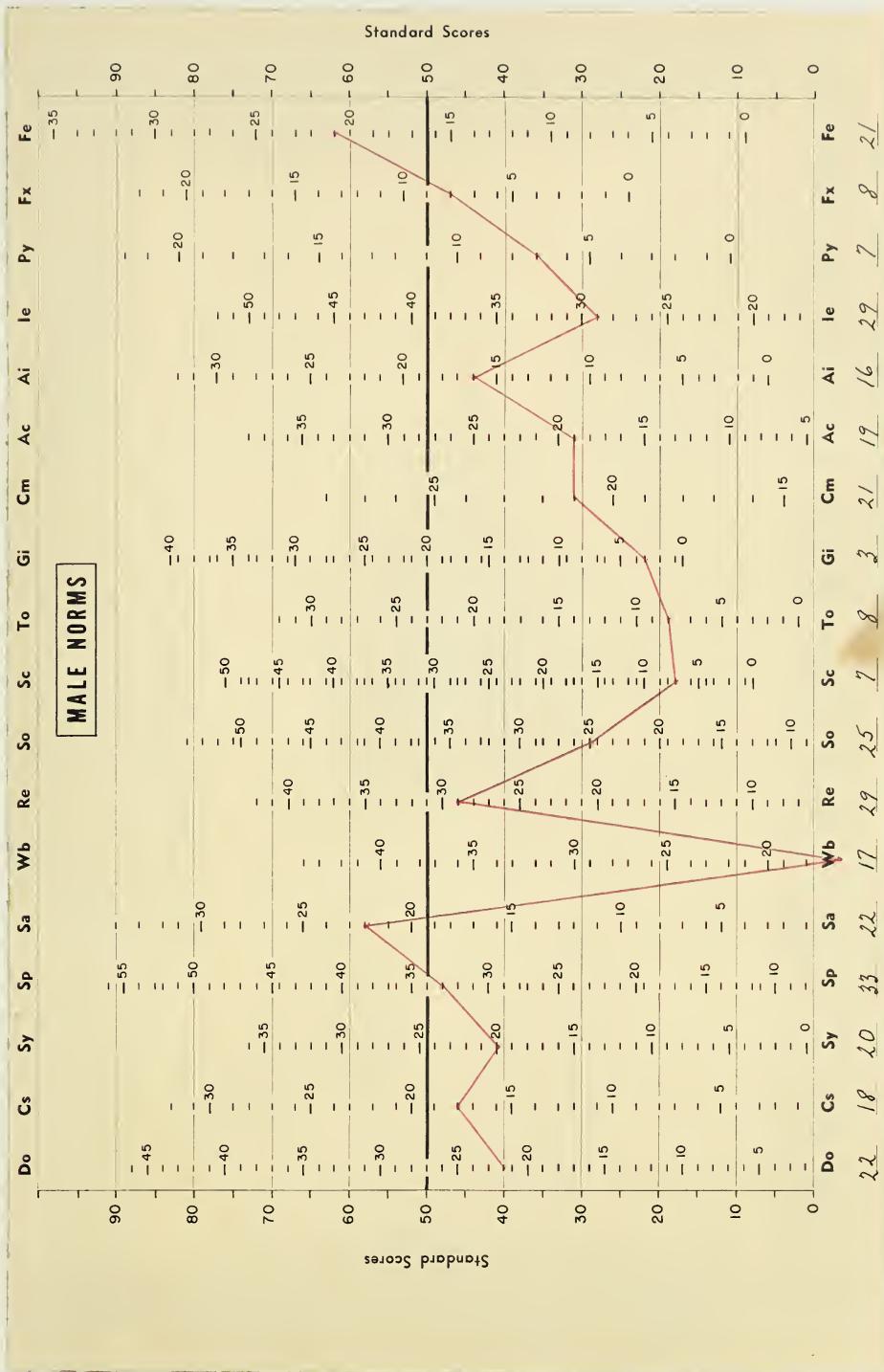
Yours sincerely,

A. J. COOK,
Director

AJC/sg



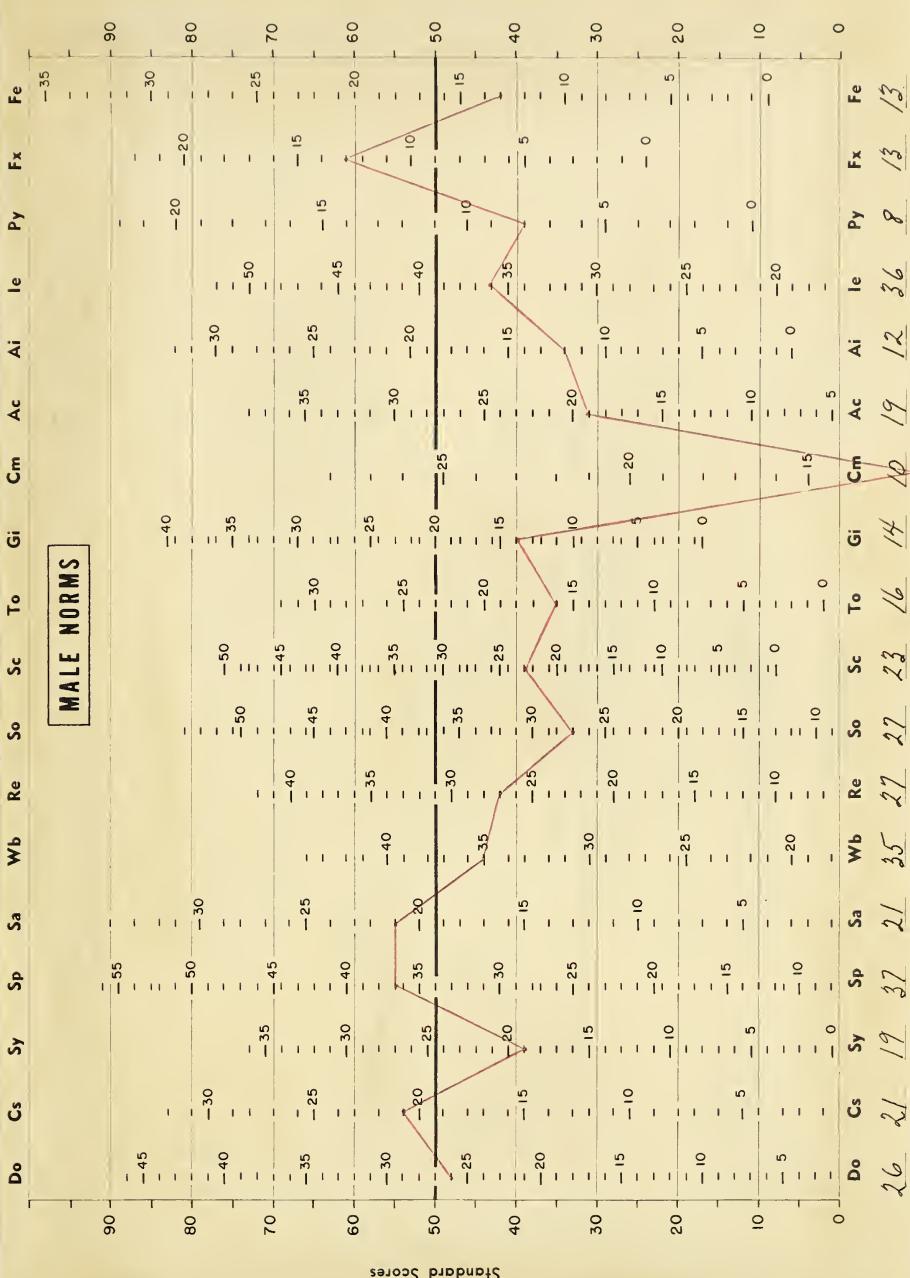
APPENDIX "B" (a)



Profile for a Freshman Male Student
Showing Evidence of "Faking Bad".

APPENDIX "E" (b)

Standard Scores



Profile for a Freshman Male Student
Showing Evidence of "Random Answering".

APPENDIX "C"

Copy of the Mailing Card Used to Invite
Students in the Probation and Non-
Probation Samples to Participate
in the Study.

First floor, Administration Bldg.,
University of Alberta

114th Street and 89th Avenue
Edmonton, Alberta

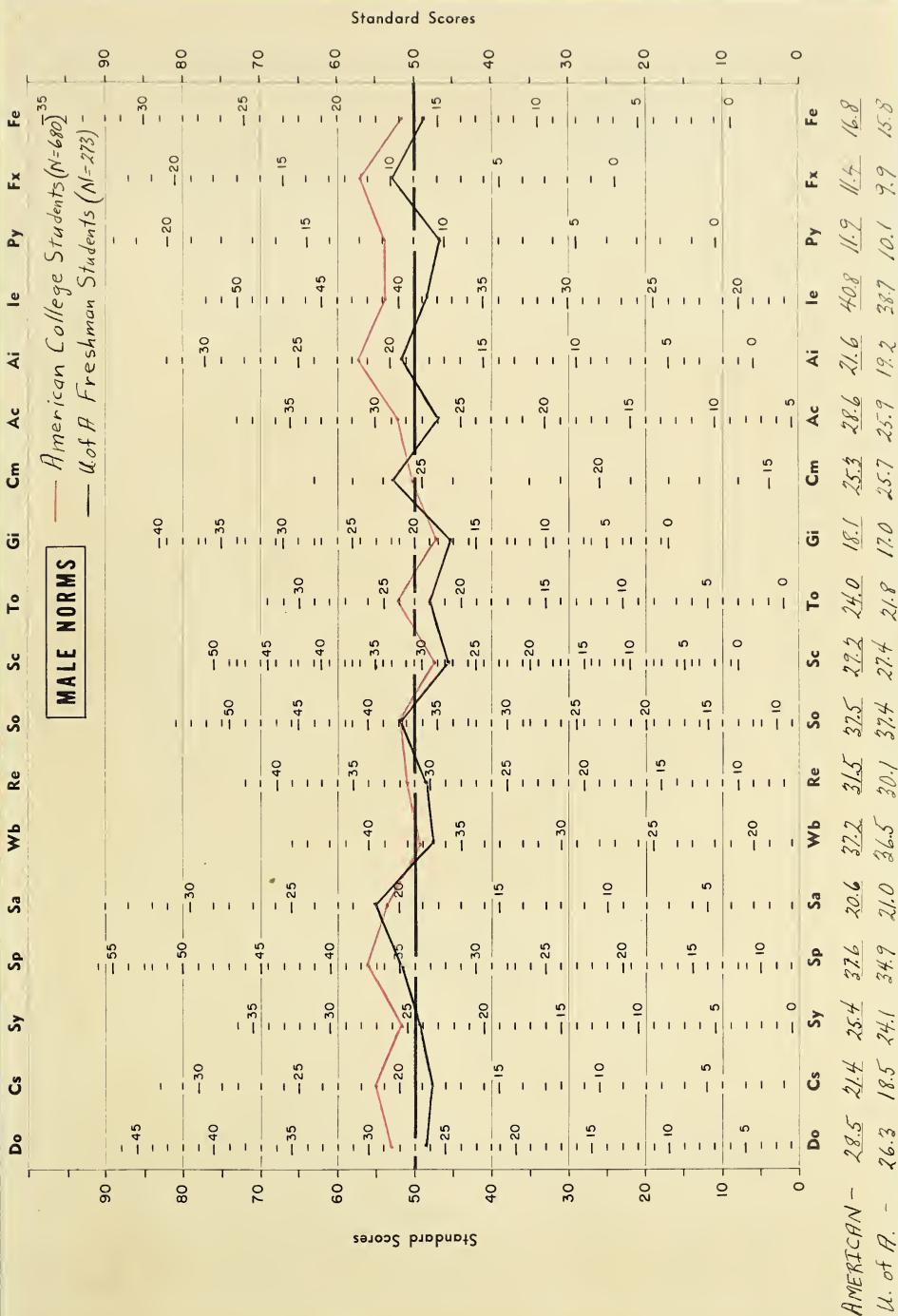
STUDENT ADVISORY SERVICES
Phone 369229

Please ~~phone or~~ call in to this office to arrange an interview.
as soon as possible to see Mr. Fair for a few
minutes any day between 9:00 and 9:30 a.m. or
1:15 and 1:30 p.m.

Sincerely,
A. J. COOK,
Director.

Per mf

APPENDIX "D"



Means for the Normative Sample of 273 University of Alberta Freshman Male Students and Means for a Sample of 680 American Male College Students Plotted on Gough's Profile Sheet.

B29780